

**Contra Costa County Employees'
Retirement Association**

ACTUARIAL EXPERIENCE STUDY

**Analysis of Actuarial Experience
During the Period
January 1, 2012 through December 31, 2014**

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June 1, 2016

Board of Retirement
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

**Re: Review of Demographic Actuarial Assumptions
for the December 31, 2015 Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the Contra Costa County Employees' Retirement Association. This study generally utilizes the census data for the period from January 1, 2012 through December 31, 2014. The study develops the proposed actuarial assumptions to be used in future actuarial valuations starting with the December 31, 2015 actuarial valuation.

Please note that we have also reviewed the economic assumptions. The economic actuarial assumption recommendations for the December 31, 2015 valuation were provided in a separate report issued on April 19, 2016.

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".

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

A handwritten signature in black ink, appearing to read "John Monroe".

John Monroe, ASA, MAAA, EA
Vice President and Actuary

JEM/hy

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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 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 January 1, 2012 through December 31, 2014. 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 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.

In this report we are recommending changes in the assumptions for retirement from active employment, pre-retirement mortality, healthy life post-retirement mortality, disabled life post-retirement mortality, turnover, disability incidence, promotional and merit salary increases, leave cashouts, sick leave conversion, spousal age difference, percent of members assumed to go on to work for a reciprocal system and reciprocal salary increases.

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

Ref: Pg. 6 **Retirement Rates** - The probability of retirement at each age at which participants are eligible to retire.

Recommendation: For active members, adjust the current retirement rates to those developed in Section III(B). General members are assumed to retire at slightly later ages overall while Safety members are assumed to retire at slightly earlier ages overall.

Ref: Pg. 24 **Mortality Rates** - The probability of dying at each age. Mortality rates are used to project life expectancies.

Recommendation: Change the current mortality tables to generational mortality tables as developed in Sections III(C) and III(D).

Ref: Pg. 39 **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). Overall, the termination rates have been increased.

Ref: Pg. 46 **Disability Incidence Rates** - The probability of becoming disabled at each age.

Recommendation: Slightly decrease the current disability rates for General members and increase the current disability rates for 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 promotional and merit increases to those developed in Section III(G). Overall, future salary increases due to promotional and merit increases are higher under the new assumptions for both General and Safety members. Overall, total assumed salary increases are lower for both General and Safety members due to the lower wage inflation assumption adopted by the Retirement Board in April 2016.

Ref: Pg. 58

Leave Cashouts – Additional pay elements that are expected to be received during the member's final average earnings period.

Recommendation: Adjust the current leave cashout assumptions to those developed in Section III(H). Overall, the leave cashout assumptions are slightly lower under the new assumptions.

Ref: Pg. 62 Service From Unused Sick Leave Conversion – Additional service that is expected to be received when the member retires due to conversion of unused sick leave.

Recommendation: Adjust the current sick leave conversion assumptions to those developed in Section III(I). Overall, the sick leave conversion assumptions are slightly lower under the new assumptions.

We have estimated the impact of the previously adopted economic assumption changes and proposed demographic assumption changes as if they were applied to the December 31, 2014 actuarial valuation. If all of the proposed demographic assumption changes were implemented, the Plan's average employer rate would have increased by 2.87% of compensation. The average member rate would have increased by 0.53% of compensation. Of the various demographic assumption changes, the most significant cost impact is from the change to use generational mortality tables.

The estimated cost impact of the economic assumptions previously adopted by the Board in April 2016 was a decrease of 1.18% of compensation for the average employer rate and 0.67% of compensation for the average member rate.

The estimated cost impact of the proposed change to an explicit administrative expense load is an increase of 0.77% of compensation for the employer rates and 0.23% of compensation for the member rates.

Therefore, the estimated cost impact of all adopted and proposed assumption changes (including demographic, economic and explicit administrative expense load) is an increase of 2.46% of compensation for the average employer rate, where the Normal Cost rate increased by 0.13%, the UAAL amortization rate increased by 1.56% and the explicit administrative expense load is 0.77%. The estimated increase in the average member rate is 0.09% of compensation, including the explicit administrative load of 0.23%. The allocation of the explicit administrative expense load between employers and members is discussed in the economic assumptions report.

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. Section IV shows the cost impact of the proposed assumption changes.

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, 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., termination from service, disability incidence, service retirement, and death after retirement. In addition to decrements, other demographic assumptions reviewed in this study include the percentage of members with a spouse or domestic partner, spousal age difference, leave cashouts, service from unused sick leave, percent of members assumed to go on to work for a reciprocal system and reciprocal salary increases. We also review the individual salary increases for active members net of inflation (i.e., the promotional and merit 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 $50 \div 500$ 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 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 demographic assumptions. See the separate report titled “Review of Economic Actuarial Assumptions for the December 31, 2015 Actuarial Valuation” that was issued on April 19, 2016.

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 table on the following page shows the observed service retirement rates for General Enhanced Tier 1 members based on the actual experience over the three-year period. 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:

General Enhanced Tier 1

Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
Under 50	0.00%	100.00%	0.00%
50	5.00	5.45	5.00
51	4.00	1.96	4.00
52	6.00	4.84	5.00
53	6.00	3.39	5.00
54	12.00	15.79	14.00
55	20.00	18.42	20.00
56	20.00	18.84	20.00
57	20.00	27.14	20.00
58	22.00	8.70	20.00
59	25.00	32.14	25.00
60	30.00	23.81	28.00
61	35.00	38.64	35.00
62	35.00	37.50	35.00
63	35.00	23.81	30.00
64	35.00	17.65	30.00
65	40.00	23.08	35.00
66	40.00	37.50	40.00
67	40.00	33.33	40.00
68	40.00	66.67	40.00
69	40.00	0.00	40.00
70	100.00	33.33	50.00
71	100.00	0.00	50.00
72	100.00	0.00	50.00
73	100.00	0.00	50.00
74	100.00	0.00	50.00
75 & Over	100.00	0.00	100.00

As shown above, we are mostly recommending decreases in the retirement rates for General Enhanced Tier 1 members. We are also increasing the age at which 100% retirement is assumed from age 70 to age 75.

Chart 1 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Enhanced Tier 1 members.

We observed that there were a significant number of retirements during 2012 and a much lower number of retirements in 2013. We believe at least some of this experience was the result of the passage of AB 197 and may not be representative of long-term retirement patterns. Our proposed retirement rates account for this by giving relatively less weight to actual experience.

The following table shows the observed retirement rates for General Enhanced Tier 3 members over the three-year period. Also shown are the current rates assumed and the rates that we propose:

General Enhanced Tier 3			
Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
Under 50	0.00%	50.00%	0.00%
50	4.00	4.84	4.00
51	3.00	2.91	3.00
52	3.00	3.55	3.00
53	5.00	5.76	5.00
54	5.00	7.39	6.00
55	10.00	12.01	10.00
56	10.00	9.86	10.00
57	10.00	10.46	10.00
58	12.00	10.95	12.00
59	12.00	16.01	13.00
60	15.00	14.49	15.00
61	20.00	19.48	20.00
62	27.00	21.08	25.00
63	27.00	23.24	25.00
64	30.00	30.92	30.00
65	40.00	42.54	35.00
66	40.00	31.76	35.00
67	40.00	27.08	35.00
68	40.00	28.57	35.00
69	40.00	36.00	35.00
70	40.00	40.43	40.00
71	40.00	25.00	40.00
72	40.00	18.18	40.00
73	40.00	22.22	40.00
74	40.00	0.00	40.00
75 & over	100.00	38.46	100.00

Overall, we are recommending decreases in the retirement rates for General Enhanced Tier 3 members.

Chart 2 compares actual experience with the current and proposed rates of retirement for General Enhanced Tier 3 members.

The following table shows the observed retirement rates for Safety Enhanced Tier A members over the three-year period. Also shown are the current rates assumed and the rates we propose:

Safety Enhanced Tier A			
Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
Under 45	0.00%	4.92%	0.00%
45	2.00	8.33	4.00
46	2.00	4.11	3.00
47	7.00	13.25	10.00
48	7.00	12.50	10.00
49	20.00	35.00	25.00
50	25.00	38.64	30.00
51	25.00	33.33	30.00
52	25.00	26.09	25.00
53	25.00	22.64	25.00
54	25.00	25.00	25.00
55	30.00	25.00	28.00
56	25.00	6.67	25.00
57	25.00	26.67	25.00
58	35.00	38.46	35.00
59	35.00	0.00	35.00
60	40.00	38.46	35.00
61	40.00	22.22	35.00
62	40.00	50.00	35.00
63	40.00	25.00	35.00
64	40.00	80.00	50.00
65 & over	100.00	50.00	100.00

Overall, we are recommending increases in the retirement rates for Safety Enhanced Tier A members.

Chart 3 compares actual experience with the current and proposed rates of retirement for Safety Enhanced Tier A members.

The following table shows the current rates assumed and the rates we propose for Safety Enhanced Tier C members:

Safety Enhanced Tier C		
Age	Current Rate of Retirement	Proposed Rate of Retirement
Under 45	0.00%	0.00%
45	1.00	2.00
46	1.00	1.00
47	3.00	4.00
48	3.00	4.00
49	10.00	12.00
50	15.00	18.00
51	15.00	18.00
52	15.00	15.00
53	15.00	15.00
54	15.00	15.00
55	20.00	18.00
56	15.00	15.00
57	15.00	15.00
58	25.00	25.00
59	25.00	25.00
60	35.00	30.00
61	35.00	30.00
62	35.00	30.00
63	35.00	30.00
64	35.00	40.00
65 & over	100.00	100.00

We recommend increasing retirement rates for some ages for Safety Enhanced Tier C members. There were no actual retirements during this period for members in this tier. We have based our recommended rates on a combination of the current assumption used for Safety Enhanced Tier C and the greater than expected actual retirement experience that occurred for Safety Enhanced Tier A members.

Chart 4 compares the current rates with the proposed rates of retirement for Safety Enhanced Tier C members.

The following table shows the current and proposed rates as well as the observed rates for General Non-enhanced members:

General Non-enhanced Tier 1			
Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
Under 50	0.00%	0.00%	0.00%
50	3.00	0.00	3.00
51	3.00	0.00	3.00
52	3.00	0.00	3.00
53	3.00	0.00	3.00
54	3.00	0.00	3.00
55	10.00	0.00	10.00
56	10.00	0.00	10.00
57	10.00	0.00	10.00
58	10.00	0.00	10.00
59	10.00	0.00	10.00
60	25.00	0.00	25.00
61	15.00	0.00	15.00
62	40.00	0.00	40.00
63	25.00	100.00	35.00
64	30.00	0.00	30.00
65	40.00	0.00	40.00
66	35.00	0.00	35.00
67	35.00	100.00	35.00
68	35.00	0.00	35.00
69	35.00	0.00	35.00
70	100.00	0.00	50.00
71	100.00	0.00	50.00
72	100.00	0.00	50.00
73	100.00	0.00	50.00
74	100.00	0.00	50.00
75 & over	100.00	0.00	100.00

For General Tier 1 members not covered under the enhanced benefit formulas, we are recommending some increases to the retirement rates. There is only a small group of members covered by the non-enhanced formulas. The proposed rates take into account a portion of the actual experience for this group. We are also increasing the age at which 100% retirement is assumed from age 70 to age 75.

Chart 5 compares actual experience with the current and proposed rates of retirement for General Non-enhanced Tier 1 members.

The following table shows the observed retirement rates for Safety Non-enhanced Tier A members. Also shown are the current rates assumed and the rates that we propose:

Safety Non-enhanced Tier A			
Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
Under 45	0.00%	0.00%	0.00%
45	0.00	0.00	0.00
46	0.00	0.00	0.00
47	0.00	0.00	0.00
48	0.00	0.00	0.00
49	0.00	0.00	0.00
50	5.00	0.00	5.00
51	4.00	0.00	4.00
52	4.00	0.00	4.00
53	5.00	0.00	5.00
54	5.00	33.33	8.00
55	6.00	50.00	10.00
56	8.00	100.00	10.00
57	12.00	0.00	12.00
58	18.00	0.00	18.00
59	20.00	0.00	20.00
60	20.00	0.00	20.00
61	20.00	0.00	20.00
62	20.00	0.00	20.00
63	20.00	0.00	20.00
64	100.00	0.00	100.00
65 & over	100.00	0.00	100.00

There is only a small group of members covered under the Safety Non-enhanced Tier A formula. We recommend increasing the retirement rates for Safety Non-enhanced Tier A members. The proposed rates take into account a portion of the actual experience for this group.

Chart 6 compares the current rates with the proposed rates of retirement for Safety Non-enhanced Tier A members.

Effective January 1, 2013, new PEPRA formulas were implemented for General and Safety. For these new tiers we do not have any experience from the past three years to propose new rates based on actual retirements from members of those tiers. However, similar to Safety Enhanced Tier C, we have based our recommended rates on a combination of the current assumption, the less than expected actual retirement experience that occurred for General Tier 3 Enhanced members and the greater than expected actual retirement experience that occurred for Safety Tier A Non-enhanced members.

The following are the current and proposed rates of retirement for PEPRA members:

PEPRA General and PEPRA Safety

Age	Current PEPRA General	Proposed PEPRA General	Current PEPRA Safety	Proposed PEPRA Safety
50	0.00%	0.00%	5.00%	5.00%
51	0.00	0.00	4.00	4.00
52	2.00	2.00	4.00	4.00
53	3.00	3.00	5.00	5.00
54	3.00	3.00	5.00	6.00
55	5.00	5.00	6.00	10.00
56	5.00	5.00	8.00	10.00
57	6.00	6.00	12.00	18.00
58	8.00	8.00	18.00	18.00
59	9.00	9.00	20.00	18.00
60	10.00	10.00	20.00	18.00
61	14.00	14.00	20.00	20.00
62	21.00	20.00	20.00	20.00
63	21.00	20.00	20.00	20.00
64	21.00	20.00	100.00	30.00
65	27.00	25.00	100.00	30.00
66	33.00	30.00	100.00	100.00
67	33.00	30.00	100.00	100.00
68	33.00	30.00	100.00	100.00
69	33.00	30.00	100.00	100.00
70	50.00	50.00	100.00	100.00
71	50.00	50.00	100.00	100.00
72	50.00	50.00	100.00	100.00
73	50.00	50.00	100.00	100.00
74	50.00	50.00	100.00	100.00
75 & Over	100.00	100.00	100.00	100.00

Chart 7 compares the current rates with the proposed rates of retirement for PEPRA General members.

Chart 8 compares the current rates with the proposed rates of retirement for PEPRA Safety members.

Deferred Vested Members

In prior valuations, deferred vested General and Safety members were assumed to retire at age 59 and 54, respectively. The average age at retirement over the prior three years was 58.4 for General and 53.7 for Safety. We recommend no change to this assumption.

Reciprocity

It was also assumed that 40% of inactive General and 60% of inactive Safety deferred vested members would be covered under a reciprocal retirement system and receive 5.25% salary increases from termination until their date of retirement. Based on the actual experience that 39% of all current General deferred vested members and 67% of all current Safety deferred vested members went on to be covered by a reciprocal retirement system, we recommend maintaining the current reciprocal assumption at 40% for General members and increasing the assumption for Safety members from 60% to 65%. Based on our recommended salary increase assumptions, we propose that the 5.25% salary increase assumption, which is used to anticipate salary increases from termination from CCCERA to the expected date of retirement, be reduced to 4.75% per annum.

Survivor Continuance Under Unmodified Option

In prior valuations, it was assumed that 75% of all active male members and 50% of all active female members would be married or have an eligible domestic partner when they retired. We reviewed new retirees during the three-year period and determined the actual percentage of these new retirees that had an eligible spouse or eligible domestic partner at the time of retirement. The results of that analysis are shown below.

<u>New Retirees – Actual Percent with Eligible Spouse or Domestic Partner</u>		
<u>Year</u>	<u>Male</u>	<u>Female</u>
2012	71%	56%
2013	81%	56%
2014	72%	47%
Total	74%	53%

According to experience of members who retired during the last three years, about 74% of all male members and 53% of all female members were married or had a domestic partner at retirement. We recommend maintaining this assumption at 75% for male members and 50% for female members.

Since the value of the survivor's 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 and studies done for other retirement systems, we recommend the following:

1. Since the majority of survivors are of the opposite sex, we will continue to assume that the survivor's sex is the opposite of the member. These assumptions will continue to be monitored in future experience studies.
2. The current and proposed assumptions for the age of the survivor are shown below. These assumptions will continue to be monitored in future experience studies.

Survivor Ages as Compared to Member's Age

Beneficiary Sex	Current Assumption	Actual Experience	Recommended Assumption
Male	3 years older	1.8 years older	2 years older
Female	3 years younger	2.4 years younger	3 years younger

Chart 1
Retirement Rates - General Enhanced Tier 1 Members

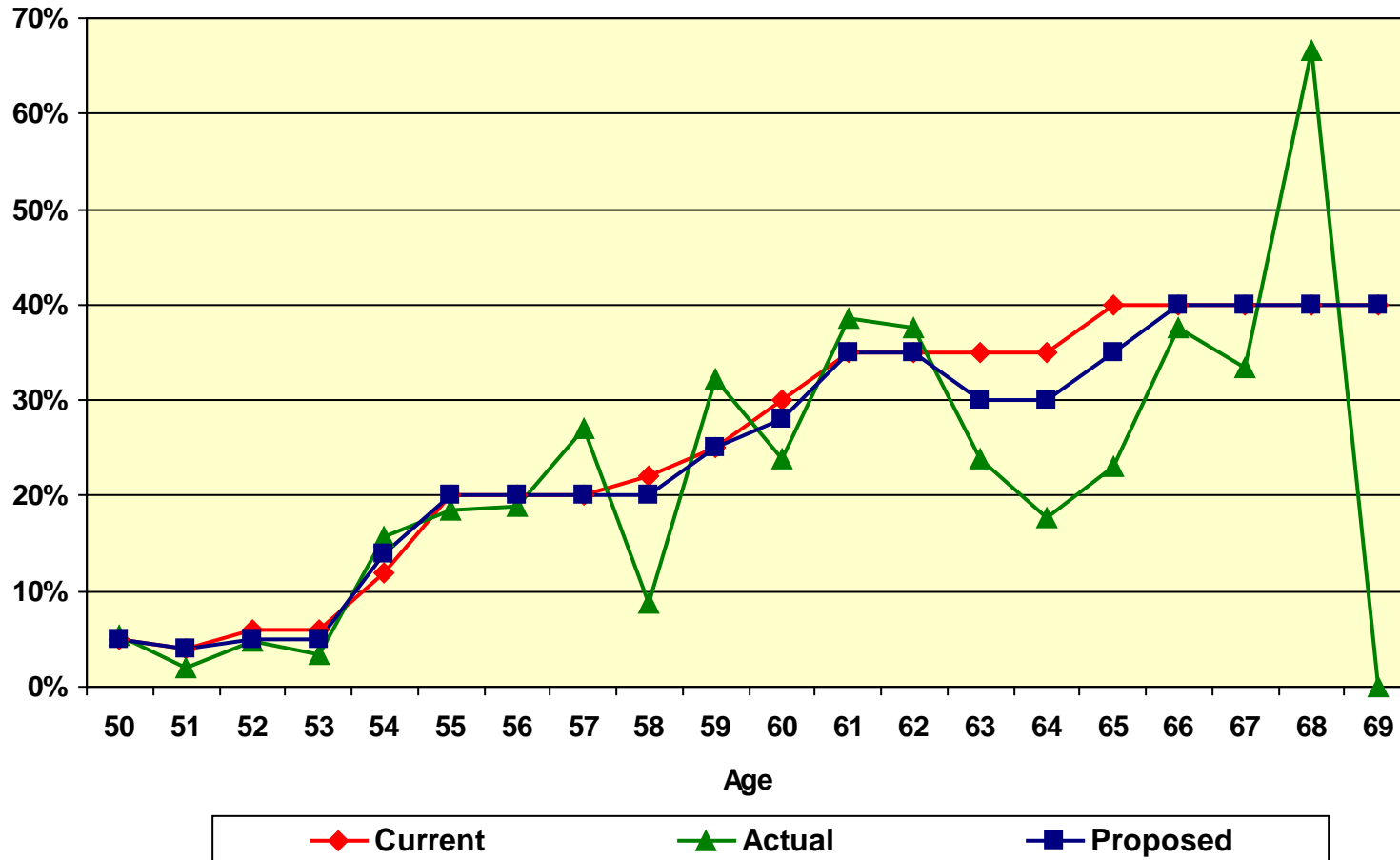


Chart 2
Retirement Rates - General Enhanced Tier 3 Members

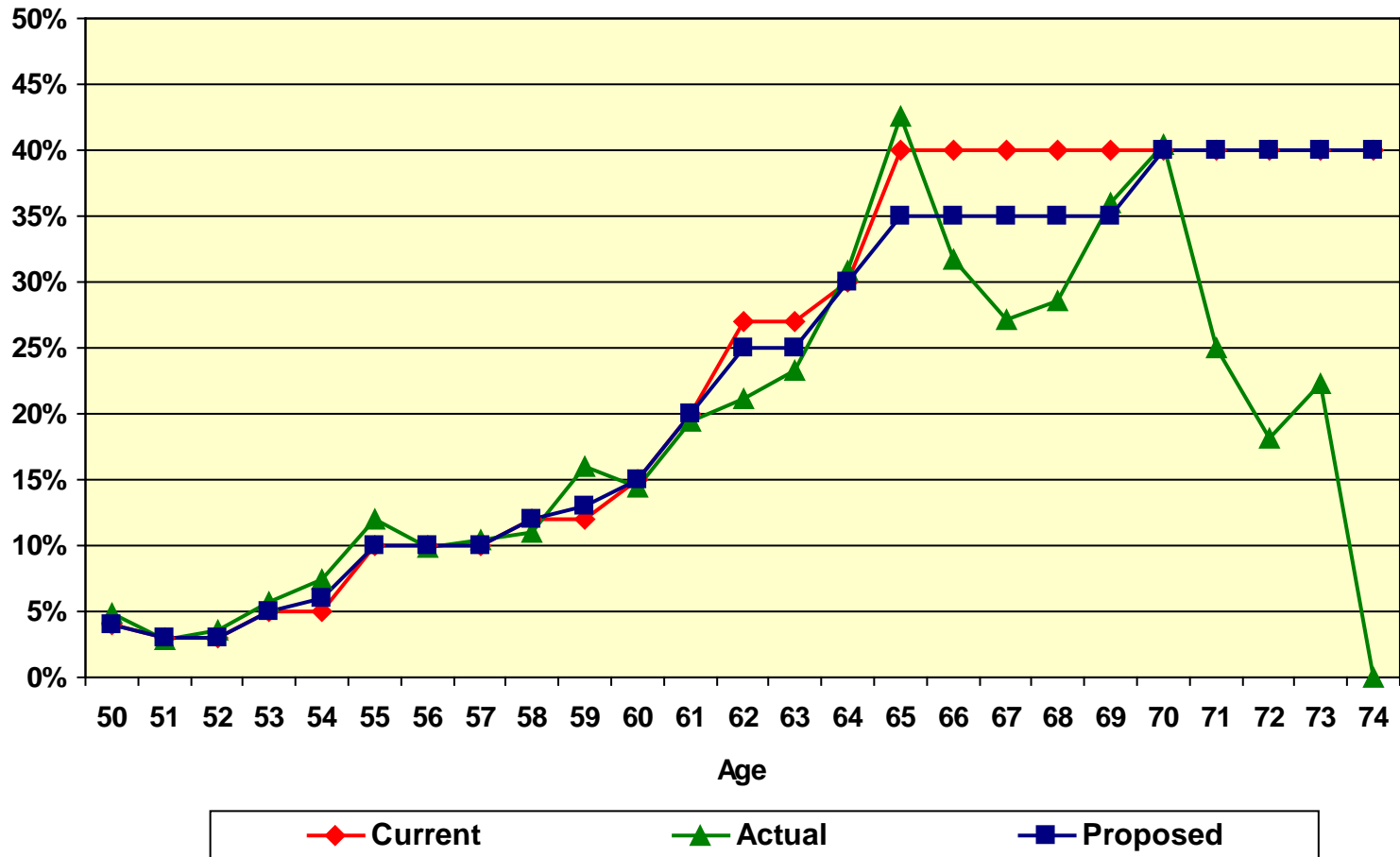


Chart 3
Retirement Rates - Safety Enhanced Tier A Members

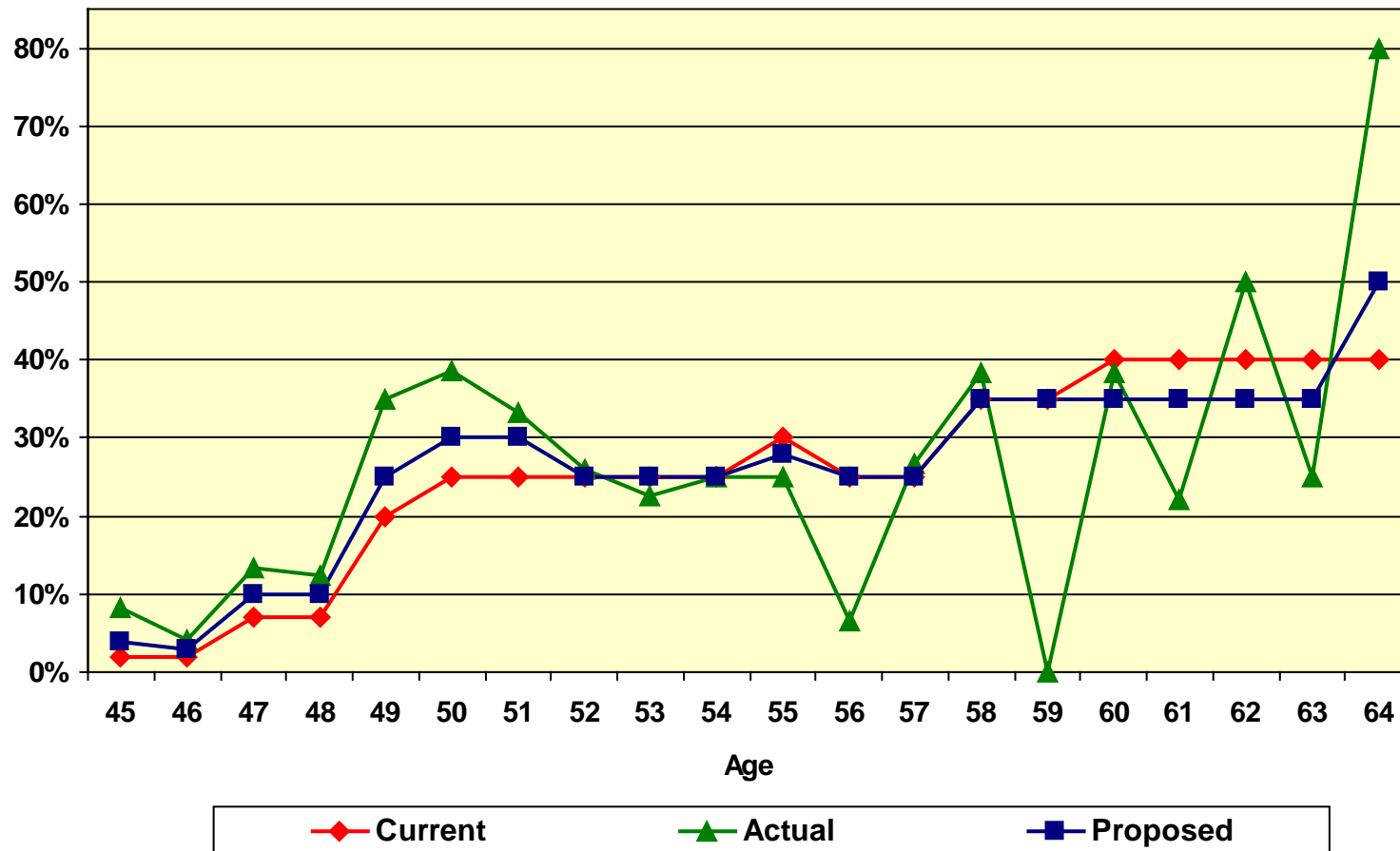


Chart 4
Retirement Rates - Safety Enhanced Tier C Members

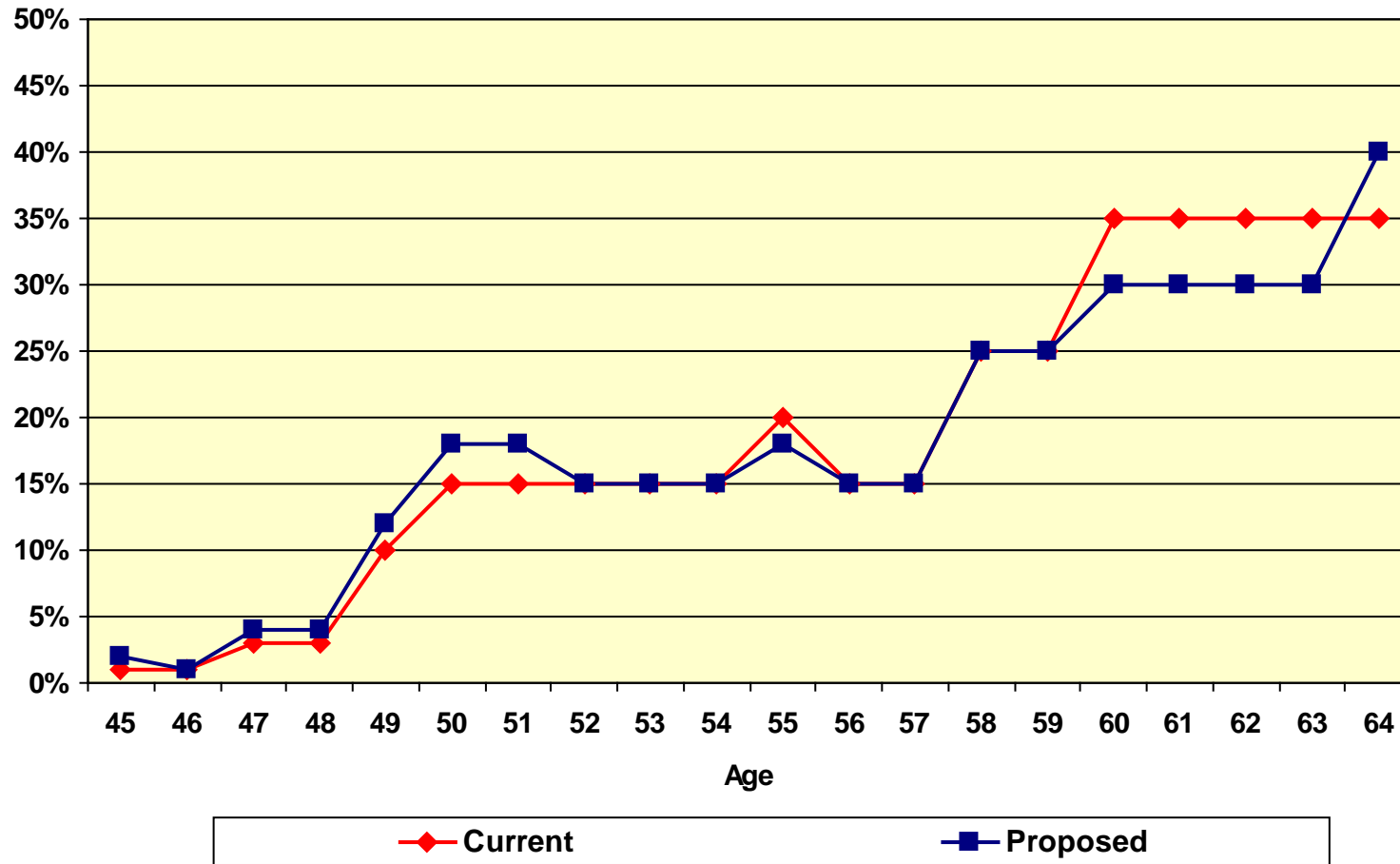


Chart 5
Retirement Rates - General Non-enhanced Tier 1 Members

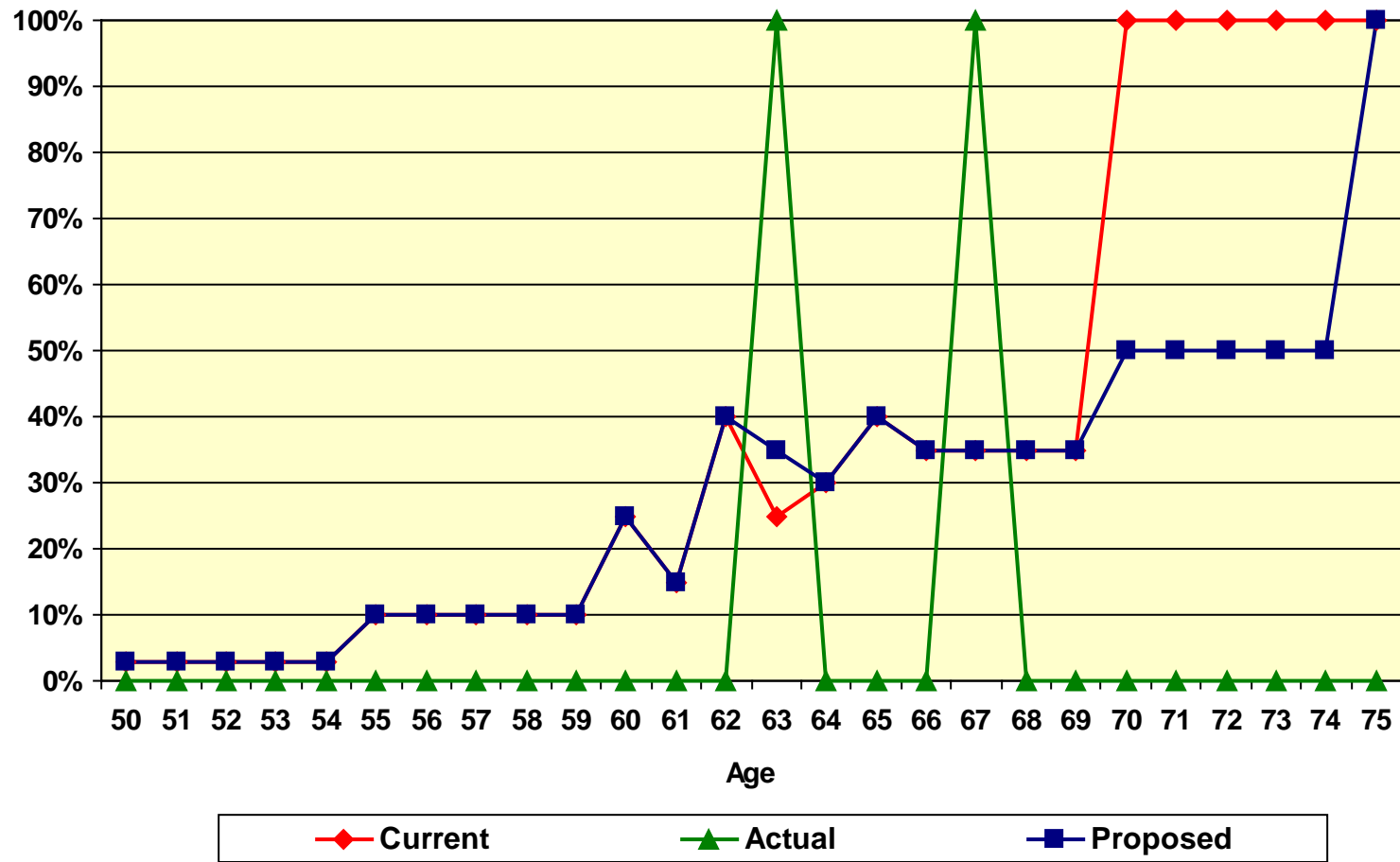


Chart 6
Retirement Rates - Safety Non-enhanced Tier A Members

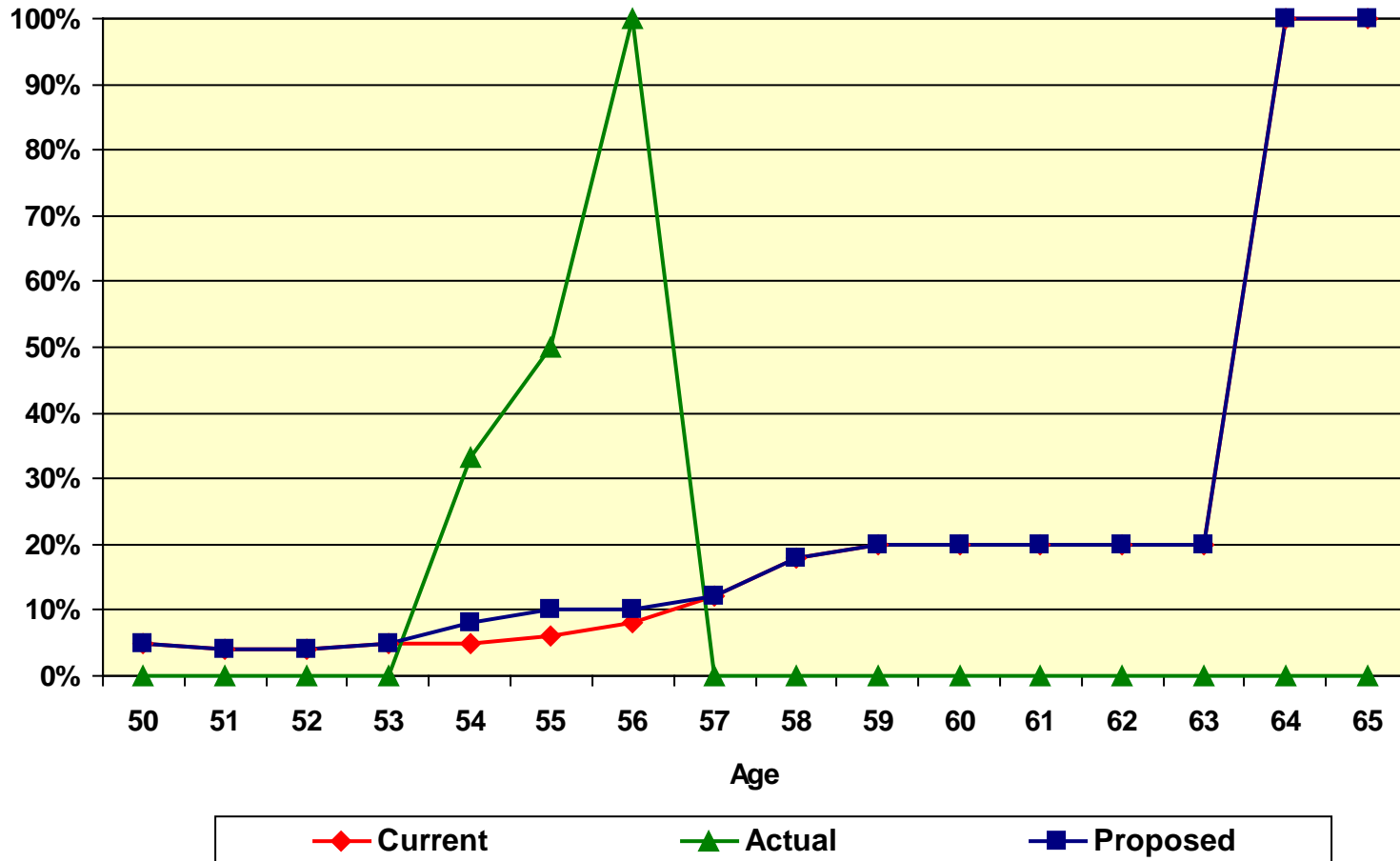


Chart 7
Retirement Rates - PEPRA General Members

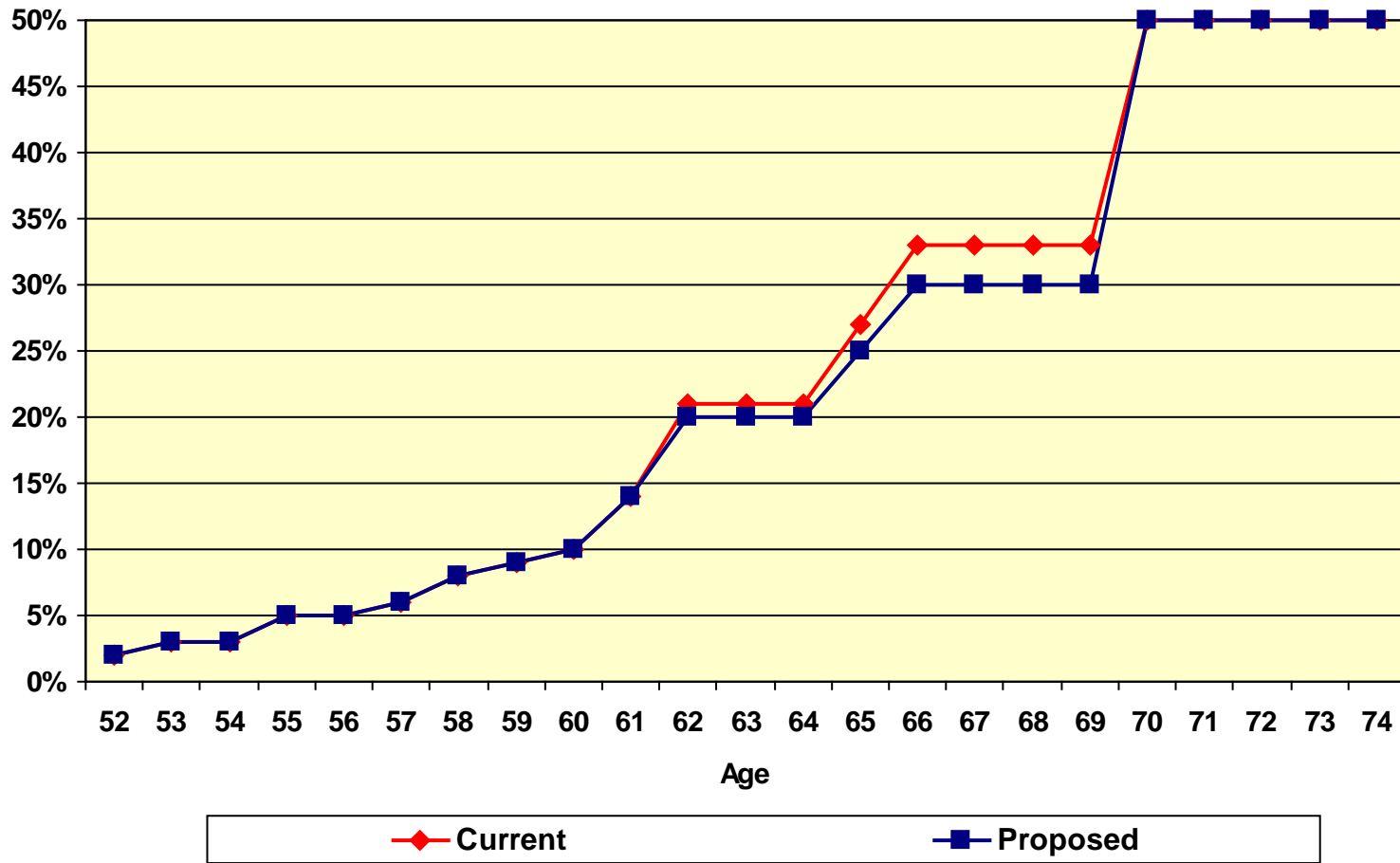
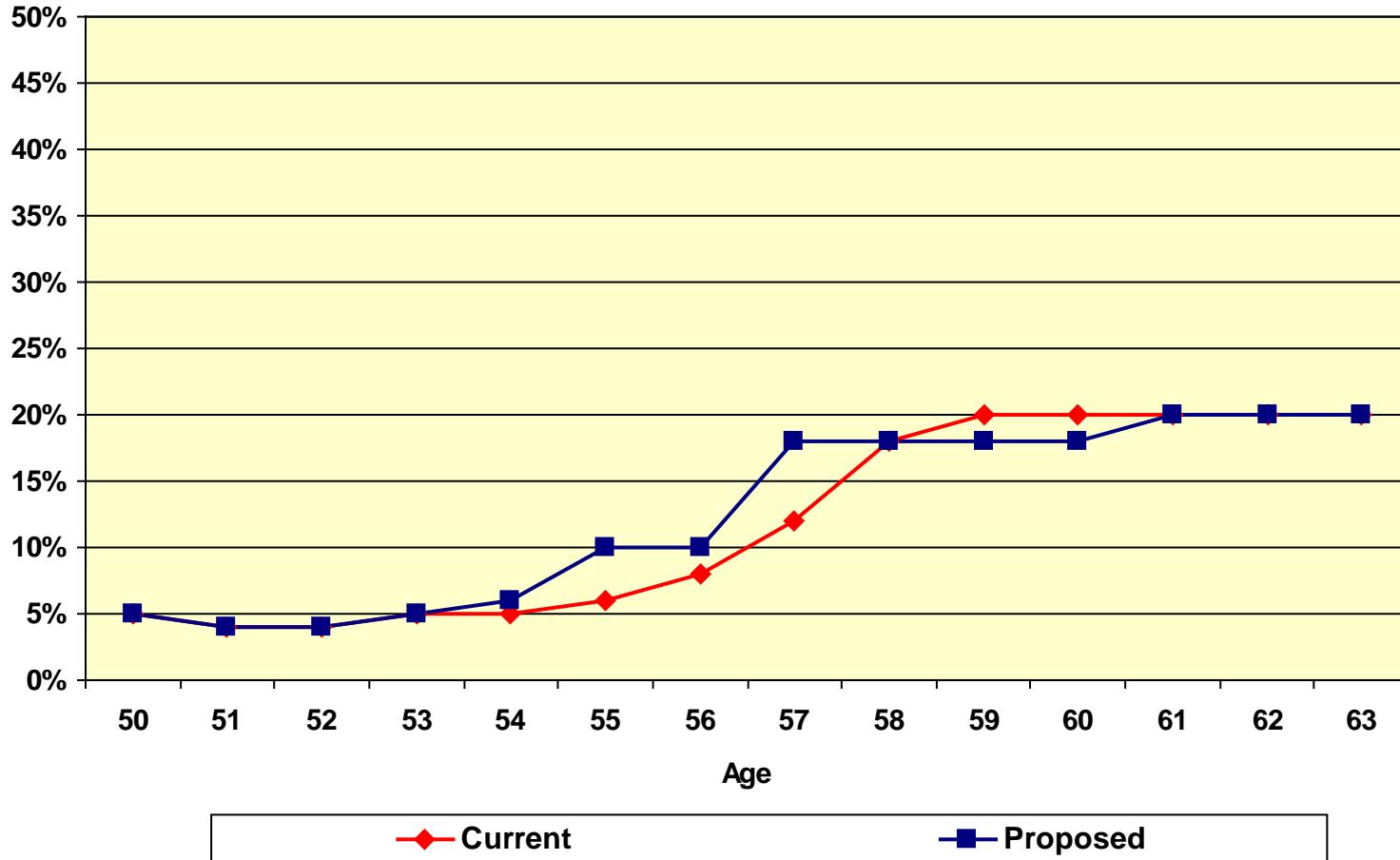


Chart 8
Retirement Rates - PEPR Safety Members



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 2030 with ages set back one year for General members and two years for Safety members. Beneficiaries are assumed to have the same mortality of a General member of the opposite sex who has taken a service (non-disabled) retirement.

The Society of Actuaries (SOA) has recently published the RP-2014 family of mortality tables and associated mortality 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 currently and is the approach used by Segal in the past for its California public system clients (including CCCERA) and by other public sector actuaries in California.

As for the mortality 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. While the static approach is still most commonly used by Segal’s California public system clients, the “generational” approach is becoming the emerging practice within the actuarial profession.

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 prior experience studies.

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 mortality improvement scale, the SOA has replaced it with the two-dimensional MP-2015 mortality improvement scale to remove some of the conservatism built into the MP-2014 scale and to better reflect the most recent data on mortality improvement from the Social Security Administration.

We recommend that given the trend in the retirement industry to move towards generational mortality, it would be reasonable for the Board to adopt the Headcount-Weighted RP-2014 mortality table (adjusted for CCCERA experience), and project the mortality improvement generationally using the MP-2015 mortality improvement scale. 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 a future experience study.

Note that in order to use more actual CCCERA experience in our analysis, we have used experience for a six-year period from both the current and the last two experience study periods to study this assumption.

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

	Combined Employer and Member Impact
Headcount Weighted RP-2014 – Static approach with increased margin	1.5% of payroll
Benefit Weighted RP-2014 – Static approach with increased margin	2.8% of payroll
Headcount Weighted RP-2014 – Generational approach	2.7% of payroll
Benefit Weighted RP-2014 – Generational approach	4.1% of payroll

Pre-Retirement Mortality

In prior experience studies, the pre-retirement mortality rates for active members were set equal to the post-retirement mortality rates for retirees since the actual number of deaths among active

members was 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) times 75%, projected generationally with the two-dimensional scale MP-2015, all to account for the lower incidences of observed pre-retirement death on the combined General and Safety workforce. All pre-retirement deaths are assumed to be ordinary (non-duty).

Post-Retirement Mortality (Service Retirements)

Our analysis starts with a table that shows, among all retired members, the actual deaths compared to the expected deaths under the current assumptions for the last six years. We also show the deaths under proposed assumptions. In prior years we have generally set the mortality assumption using a static mortality projection so that actual deaths will be at least 10% greater than those assumed. As noted above, we are recommending the use of a generational mortality table rather than static mortality. A generational mortality table 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 the current actual to expected ratio shown in the table below for General and Safety is 100% and 96%, respectively. 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. The actual deaths compared to the expected deaths under the current and proposed assumptions for the last six years are as follows:

Year	General – Healthy			Safety – Healthy		
	Expected Deaths	Actual Deaths	Proposed Expected Deaths	Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	246	284	296	72	86	86
Female	<u>448</u>	<u>499</u>	<u>486</u>	<u>10</u>	<u>6</u>	<u>10</u>
Total	694	783	782	82	92	96
Actual / Expected	113%		100%	112%		96%

For General members, the ratio of actual to expected deaths was 113%. We recommend updating the current table to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) with no age adjustment, projected generationally with the two-dimensional mortality improvement scale MP-2015. This will bring the actual to expected ratio to 100%.

For Safety members, the ratio of actual to expected deaths was 112%. We recommend updating the current table to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) with ages set back three years, projected generationally with the two-dimensional mortality improvement scale MP-2015. This will bring the actual to expected ratio to 96%.

All of this is consistent with ASOP 35 as we anticipate expected future improvement in life expectancy using the generational approach.

Chart 9 compares actual to expected deaths for General members under the current and proposed assumptions over the past six years. Experience shows that there were more deaths than predicted by the current table.

Chart 10 has the same comparison for Safety members. Experience shows that there were more deaths than predicted by the current table.

Chart 11 shows the life expectancies (i.e. expected future lifetime) under the current and the proposed tables for General members.

Chart 12 has the same information for Safety members.

The expected deaths (Charts 9 and 10) and life expectancies (Charts 11 and 12) under the proposed generational mortality table are based on mortality rates from 2014 which is the base year of the table. In practice, life expectancies will be increased after applying the mortality improvement scale.

Mortality Table for Member Contributions, Optional Forms of Payment and Reserves

There are administrative reasons why a generational mortality table may be difficult to implement for determining member contributions for legacy tiers, optional forms of payment and reserves. The emerging most common practice is to approximate the use of a generational mortality table

by the use of a static table with projection of the mortality improvement over a period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation.

We recommend that the mortality table used for determining contributions for General members be updated from the RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA set back one year, weighted 30% male and 70% female to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table projected to 2034 with the two-dimensional mortality improvement scale MP-2015, weighted 30% male and 70% female. This is based on the proposed valuation mortality tables for General members and the actual sex distribution of General members.

For Safety members, we recommend the mortality table used for determining member contributions be changed from the RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA set back two years, weighted 85% male and 15% female to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table projected to 2034 with the two-dimensional mortality improvement scale MP-2015 set back three years, weighted 85% male and 15% female. This is based on the proposed valuation mortality tables for Safety members and the actual sex distribution of Safety members.

Chart 9
Post-Retirement Deaths
Non - Disabled General Members

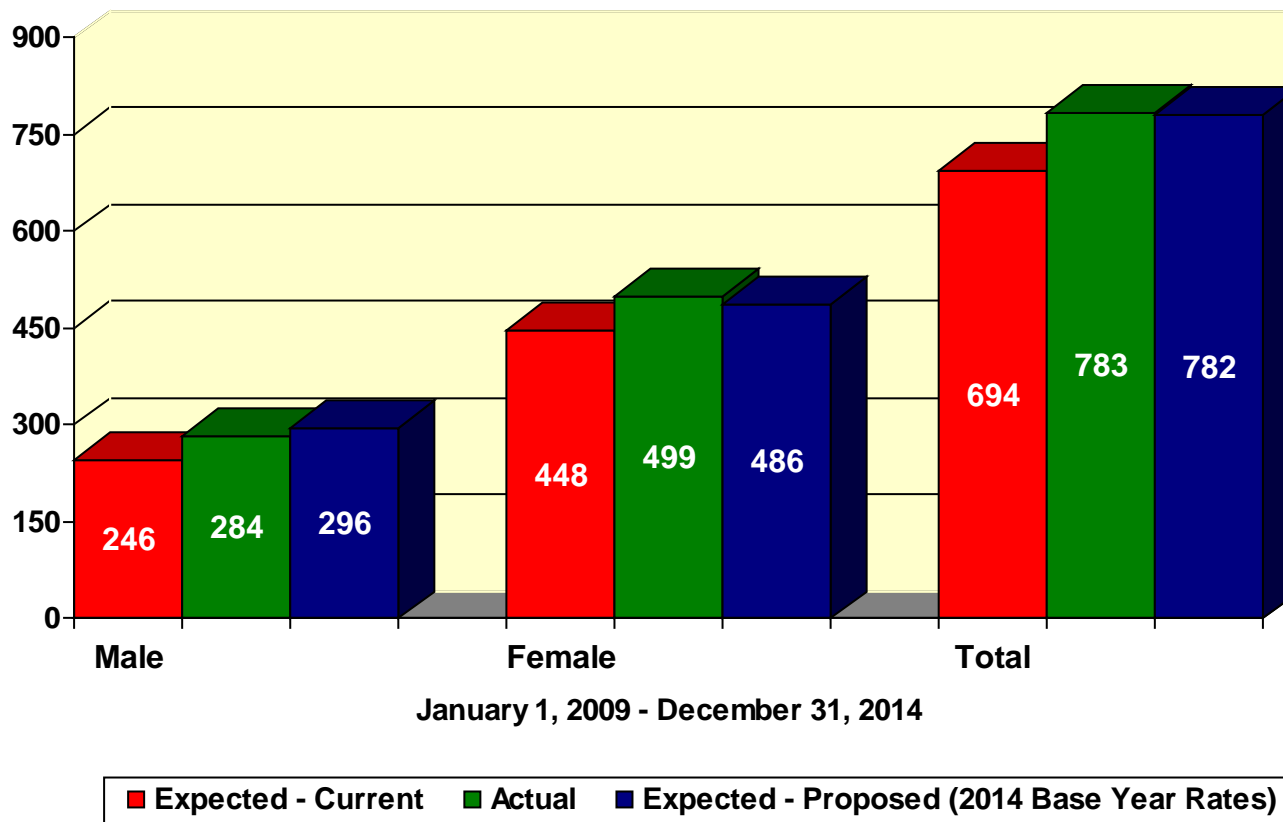
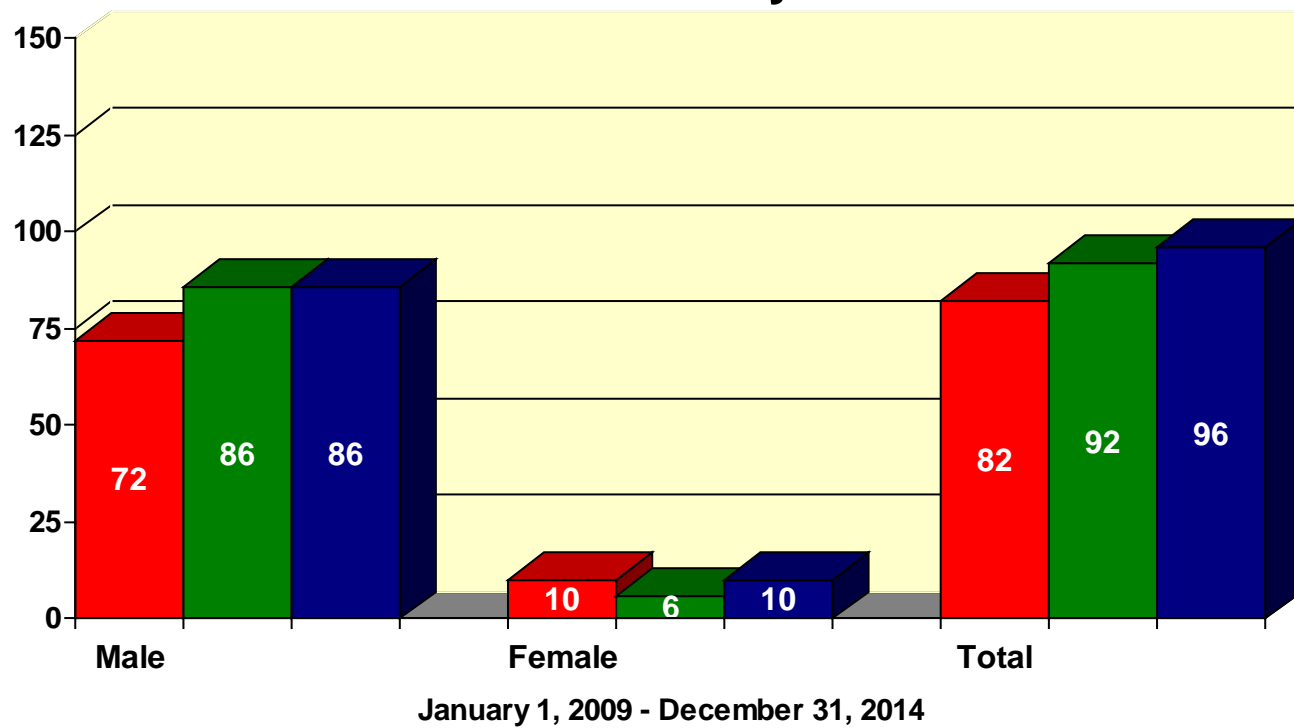


Chart 10 Post-Retirement Deaths Non - Disabled Safety Members



■ Expected - Current
 ■ Actual
 ■ Expected - Proposed (2014 Base Year Rates)

Chart 11
Life Expectancies
Non - Disabled General Members

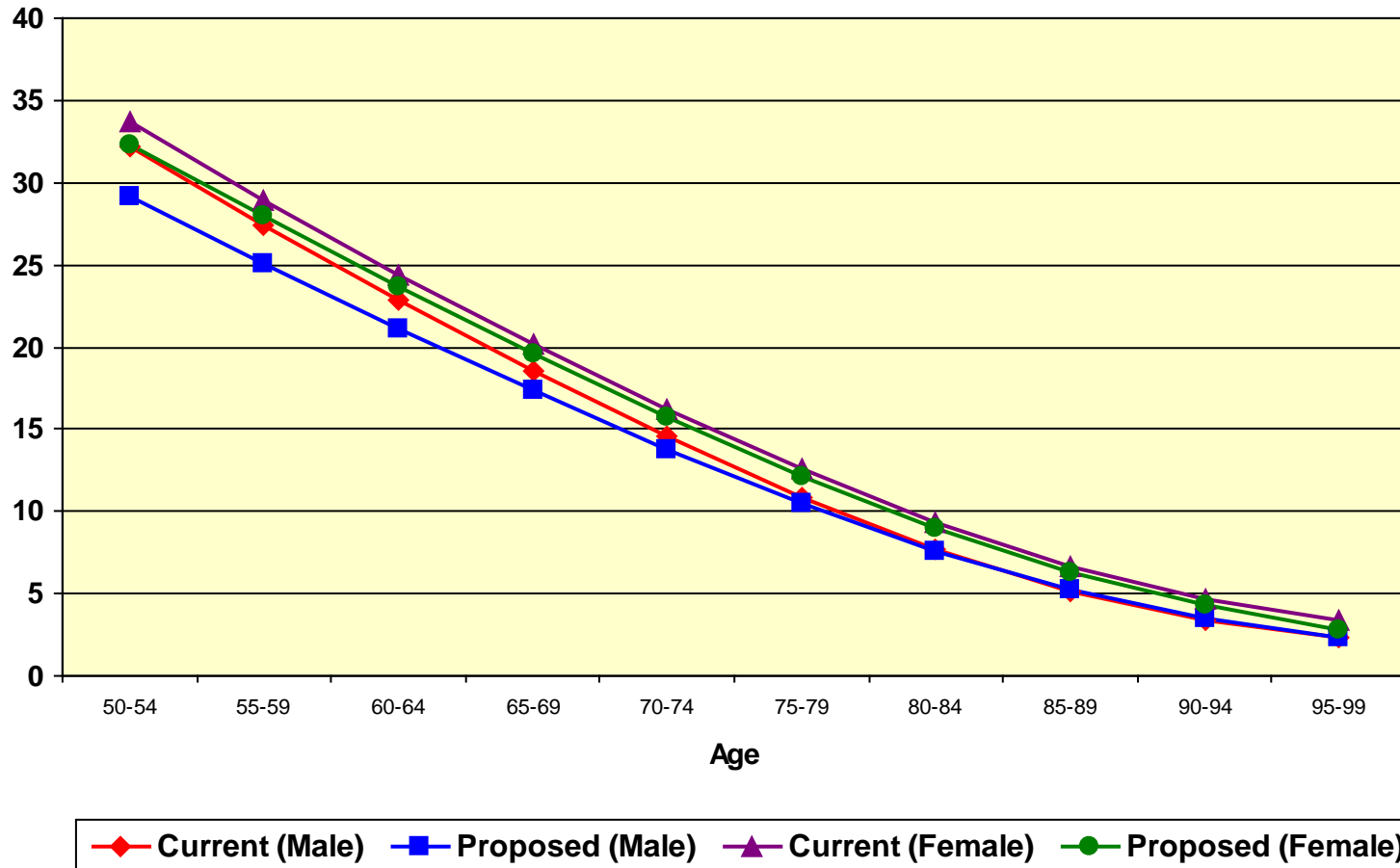
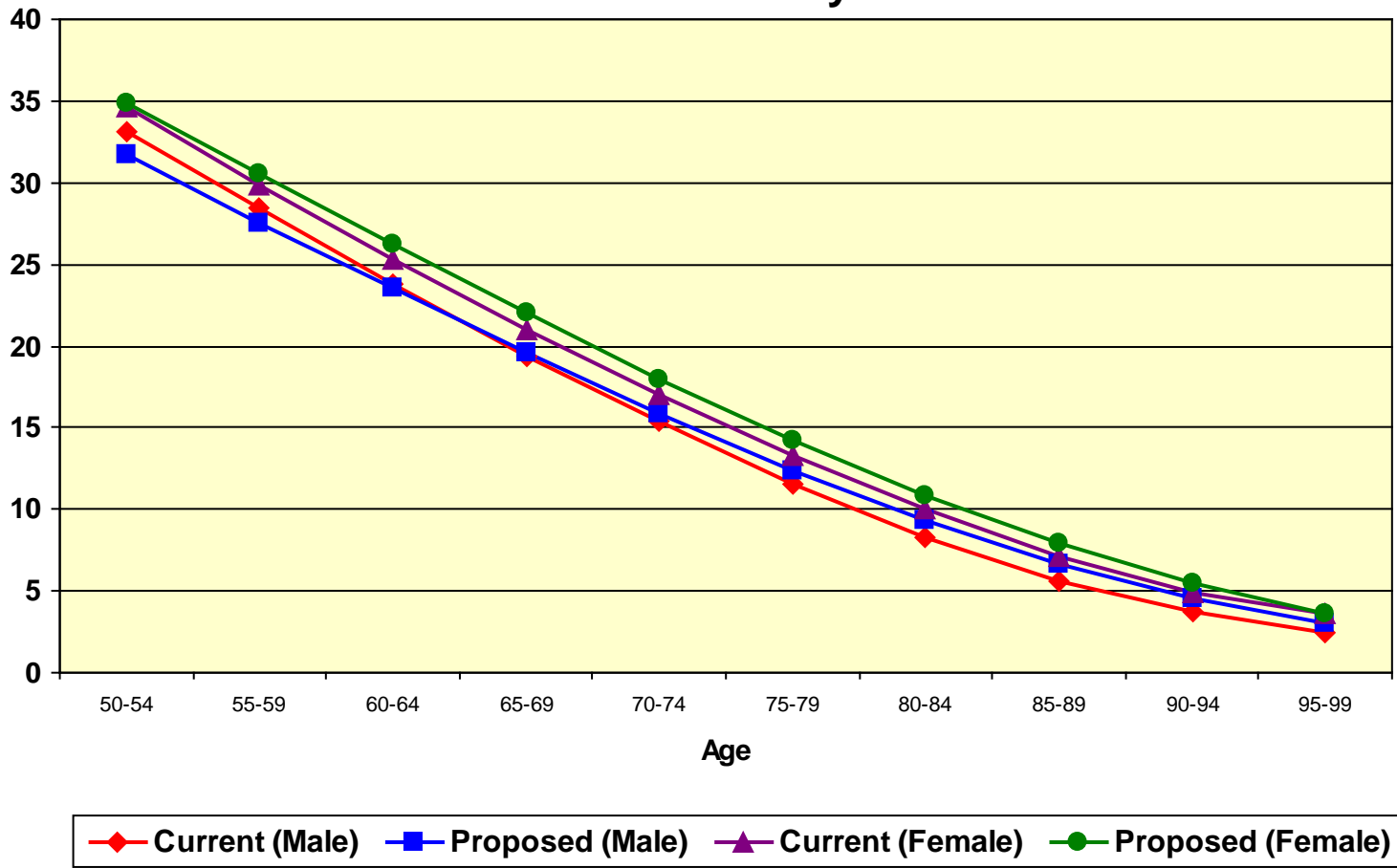


Chart 12
Life Expectancies
Non - Disabled Safety Members



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 projected with scale AA to 2030 (separate tables for males and females) set forward six years for males and seven years for females. For Safety members, the table currently being used is the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2030 (separate tables for males and females) set forward three years for both males and females.

The number of actual deaths compared to the number expected under the current and proposed assumptions for the last six years are as provided in the table below.

	General – Disabled			Safety – Disabled		
	Expected Deaths	Actual Deaths	Proposed Expected Deaths	Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	36	40	44	43	51	52
Female	<u>64</u>	<u>73</u>	<u>70</u>	<u>2</u>	<u>1</u>	<u>3</u>
Total	100	113	114	45	52	55
Actual / Expected	113%		99%	116%		95%

Based on the actual experience, we recommend changing the mortality table for General disabled members to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) set forward eight years, projected generationally with the two-dimensional mortality improvement scale MP-2015. This will bring the actual to expected ratio to 99%.

Based on the actual experience, we recommend changing the mortality table for Safety disabled members to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) set forward three years, projected generationally with the two-dimensional mortality improvement scale MP-2015. This will bring the actual to expected ratio to 95%.

Chart 13 compares actual to expected deaths under both the current and the proposed assumptions for disabled General members over the last six years. Experience shows that there were more deaths than predicted by the current table.

Chart 14 compares actual to expected deaths under both the current and the proposed assumptions for disabled Safety members over the last six years. Experience shows that there were more deaths than predicted by the current table.

Chart 15 and 16 show the life expectancies under both the current and the proposed tables for General and Safety, respectively.

The expected deaths (Charts 13 and 14) and life expectancies (Charts 15 and 16) under the proposed generational mortality table are based on mortality rates from 2014 which is the base year of the table. In practice, life expectancies will be increased after applying the mortality improvement scale.

Chart 13
Post-Retirement Deaths
Disabled General Members

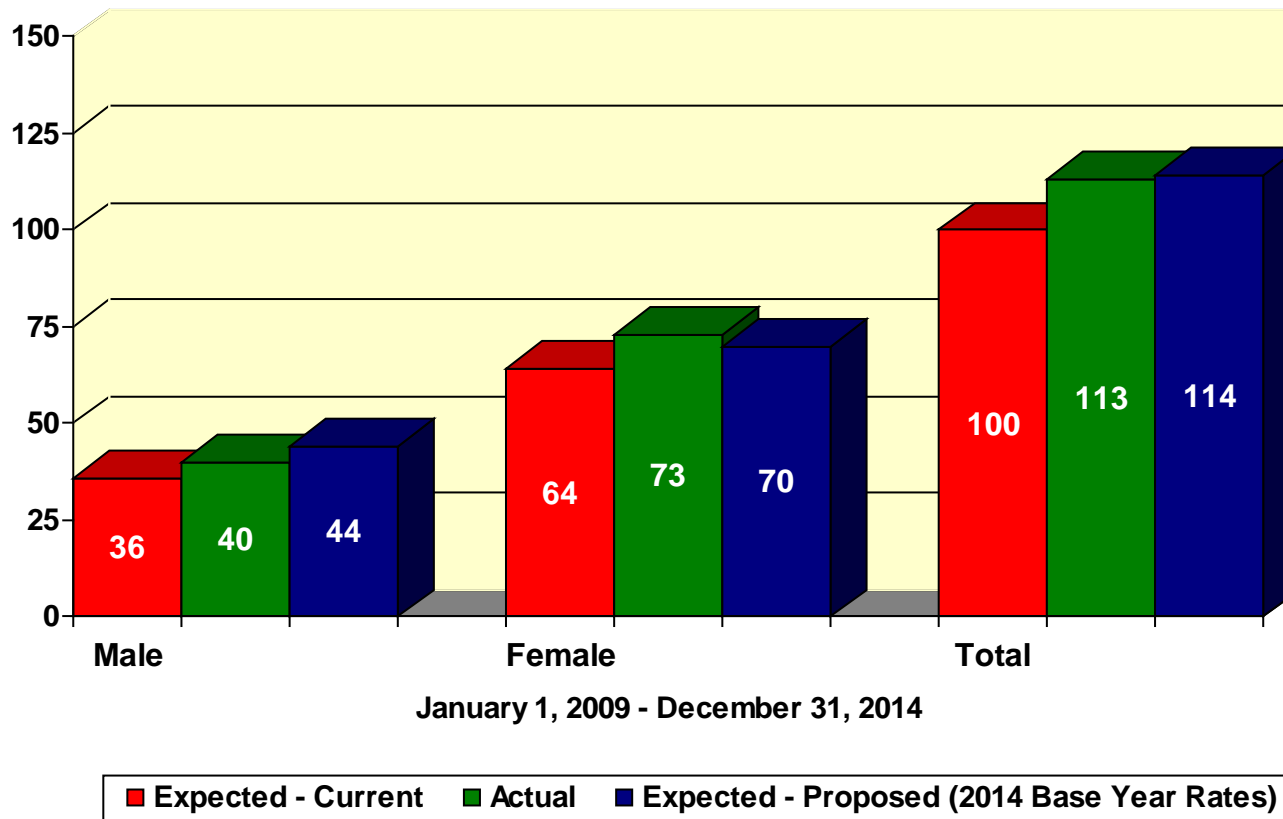


Chart 14
Post-Retirement Deaths
Disabled Safety Members

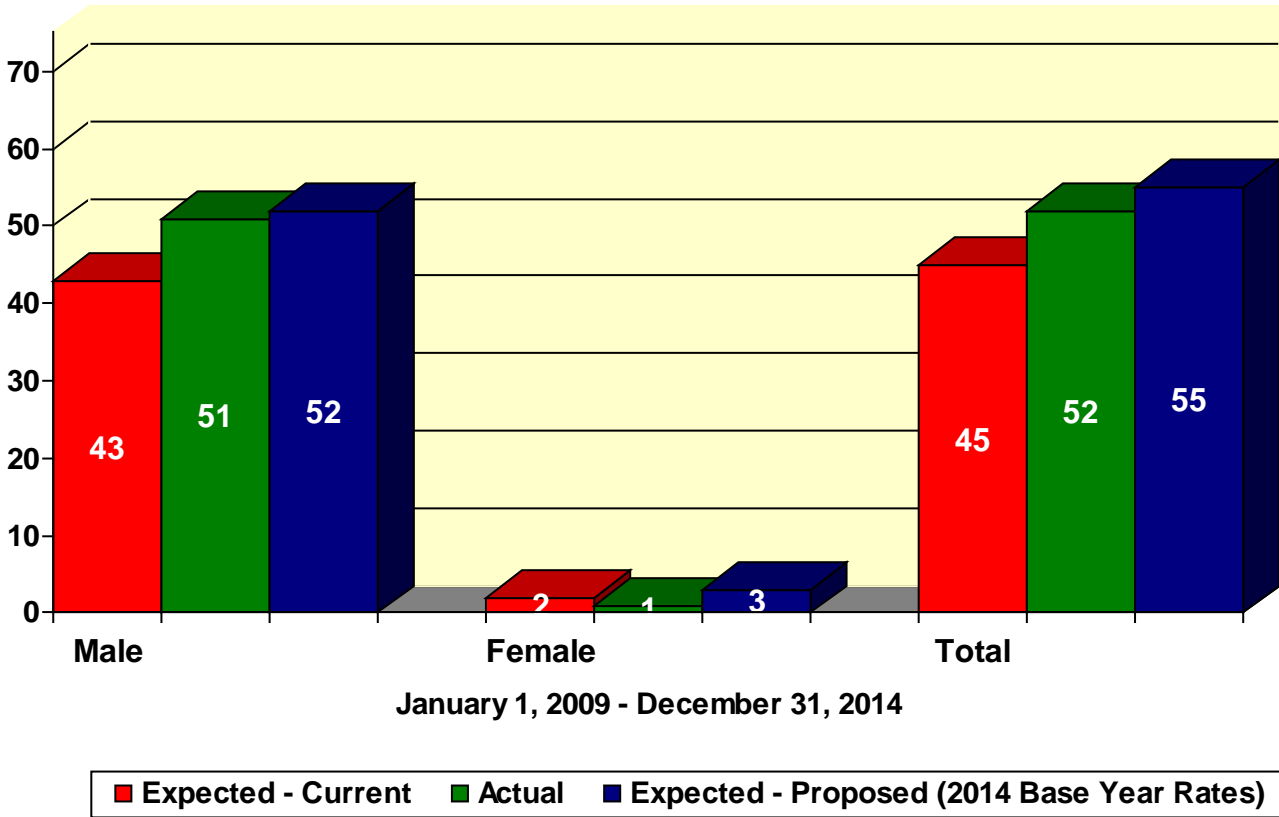


Chart 15
Life Expectancies
Disabled General Members

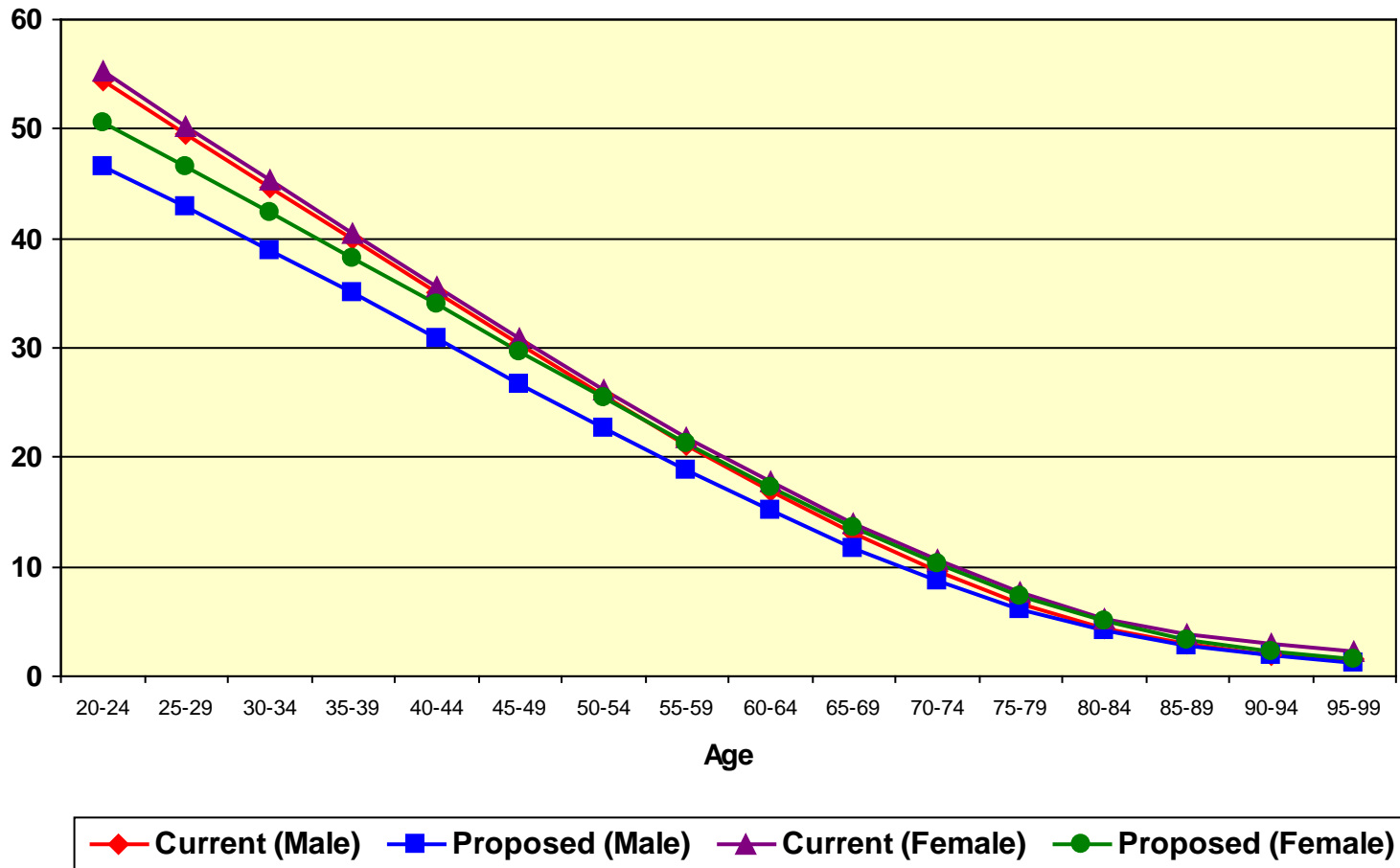
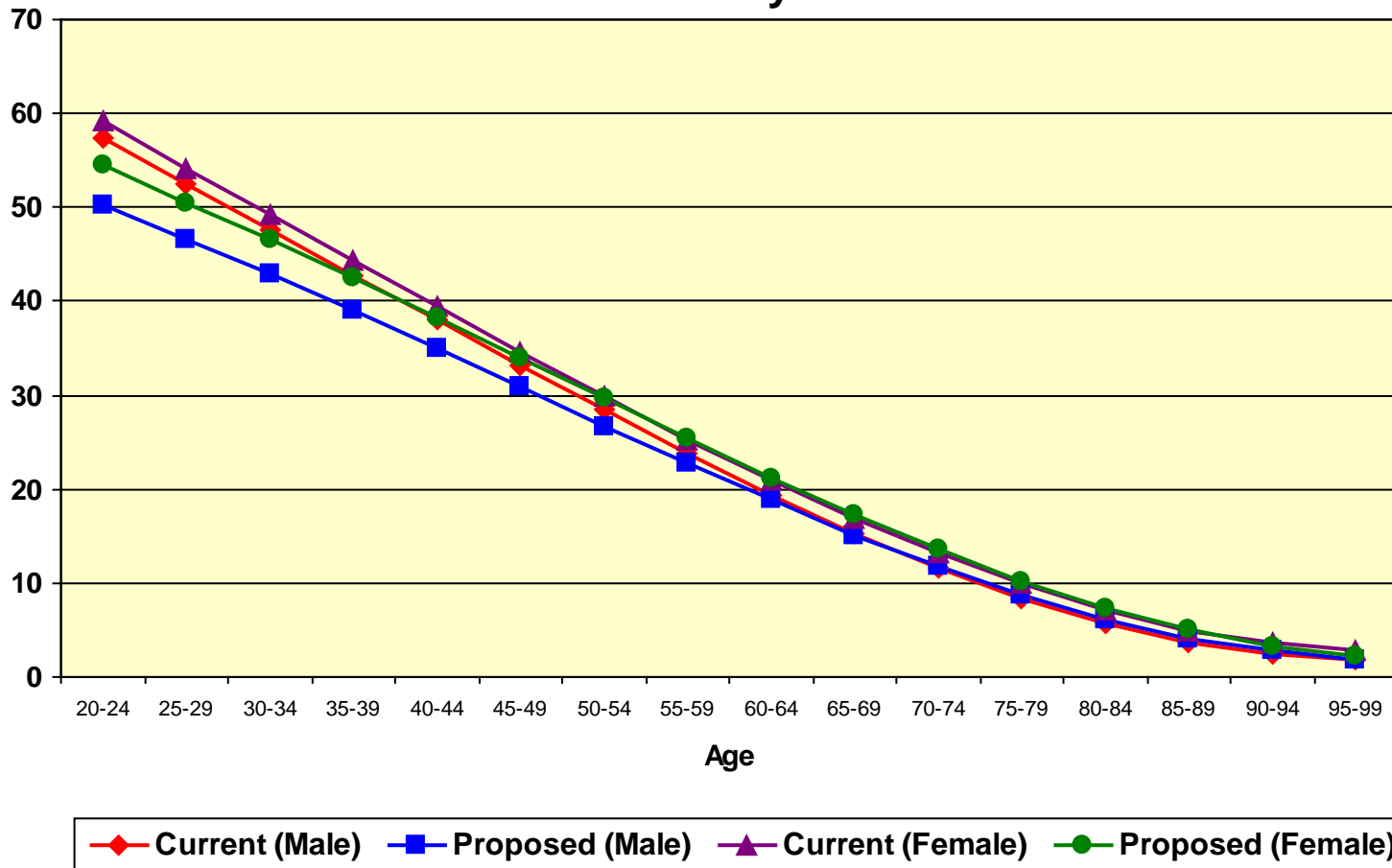


Chart 16
Life Expectancies
Disabled Safety Members



E. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is an overall incidence of termination assumed, combined with an assumption that a member will choose between a refund of contributions and deferred vested benefit based on which option is more valuable. With this study, we continue to recommend that this same assumption structure be used.

The termination experience over the last three years for General and Safety members is shown by years of service in the following tables. Please note that we have excluded any members that were eligible for retirement. We also show the current and proposed assumptions.

Rates of Termination (General)			
Years of Service	Current Rate	Observed Rate	Proposed Rate
Less than 1	13.50%	13.55%	13.50%
1	9.00	9.51	9.25
2	9.00	9.05	9.00
3	6.00	6.82	6.00
4	4.50	3.74	4.50
5	4.00	5.26	4.25
6	3.75	4.21	3.75
7	3.50	3.78	3.50
8	3.25	3.49	3.25
9	3.00	3.32	3.00
10	2.75	4.41	2.75
11	2.50	2.45	2.50
12	2.40	3.99	2.40
13	2.30	2.47	2.30
14	2.20	1.27	2.20
15	2.10	1.32	2.10
16	2.00	2.48	2.00
17	2.00	1.96	2.00
18	2.00	3.70	2.00
19	2.00	1.11	1.75
20 or more	2.00	1.40	1.50

Rates of Termination (Safety)

Years of Service	Current Rate	Observed Rate	Proposed Rate
Less than 1	11.50%	15.05%	13.00%
1	6.50	16.47	8.00
2	5.00	9.73	7.00
3	4.00	6.62	5.50
4	3.50	3.90	3.75
5	3.00	3.46	3.25
6	2.75	4.48	3.00
7	2.50	3.37	2.75
8	2.25	2.56	2.50
9	2.00	4.55	2.25
10	1.90	0.00	2.00
11	1.80	1.65	1.90
12	1.70	0.47	1.80
13	1.60	1.63	1.70
14	1.50	0.65	1.60
15	1.40	0.81	1.50
16	1.30	1.87	1.40
17	1.20	2.02	1.30
18	1.10	1.45	1.20
19	1.00	0.00	1.10
20 or more	1.00	0.00	1.00

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. This is also the case in the tables that follow due to the even more limited experience regarding actual terminations.

Chart 17 compares actual to expected terminations over the past three years for both the current and proposed assumptions for General members.

Chart 18 graphs the same information as Chart 16, but for Safety members.

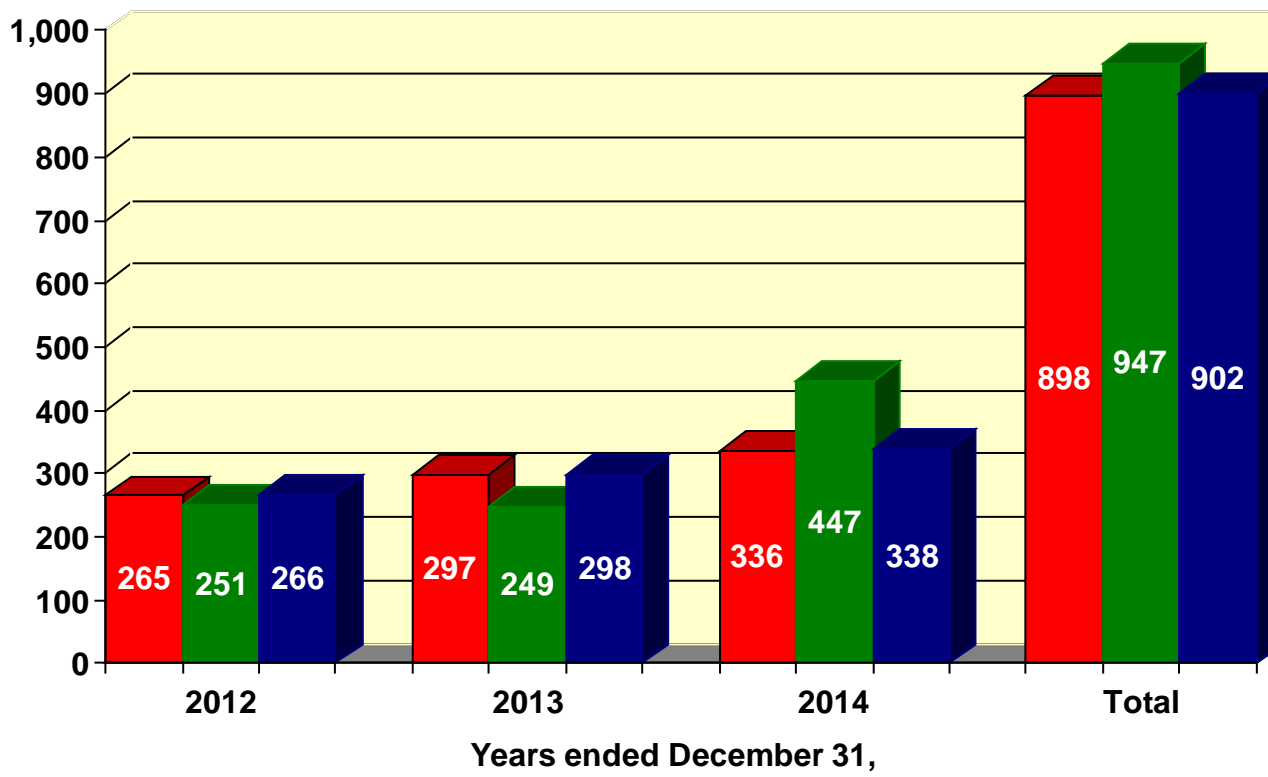
Chart 19 shows the current, along with the proposed termination rates for General members.

Chart 20 shows the same information as Chart 18, but for Safety members.

Based upon the recent experience, the termination rates for General members have been adjusted slightly. For Safety, there were more terminations than expected and we have increased the termination rates accordingly. Overall, for both General and Safety members, the proposed termination rates are higher than those under the current assumptions.

We will continue to assume that termination rates are zero at any age where members are assumed to retire. In other words, at those ages, members will either retire in accordance with the retirement rate assumptions or continue working, rather than terminate and defer their benefit.

Chart 17
Actual Number of Terminations Compared
to Expected - General Members



■ Expected - Current
 ■ Actual
 ■ Expected - Proposed

Chart 18
Actual Number of Terminations Compared
to Expected - Safety Members

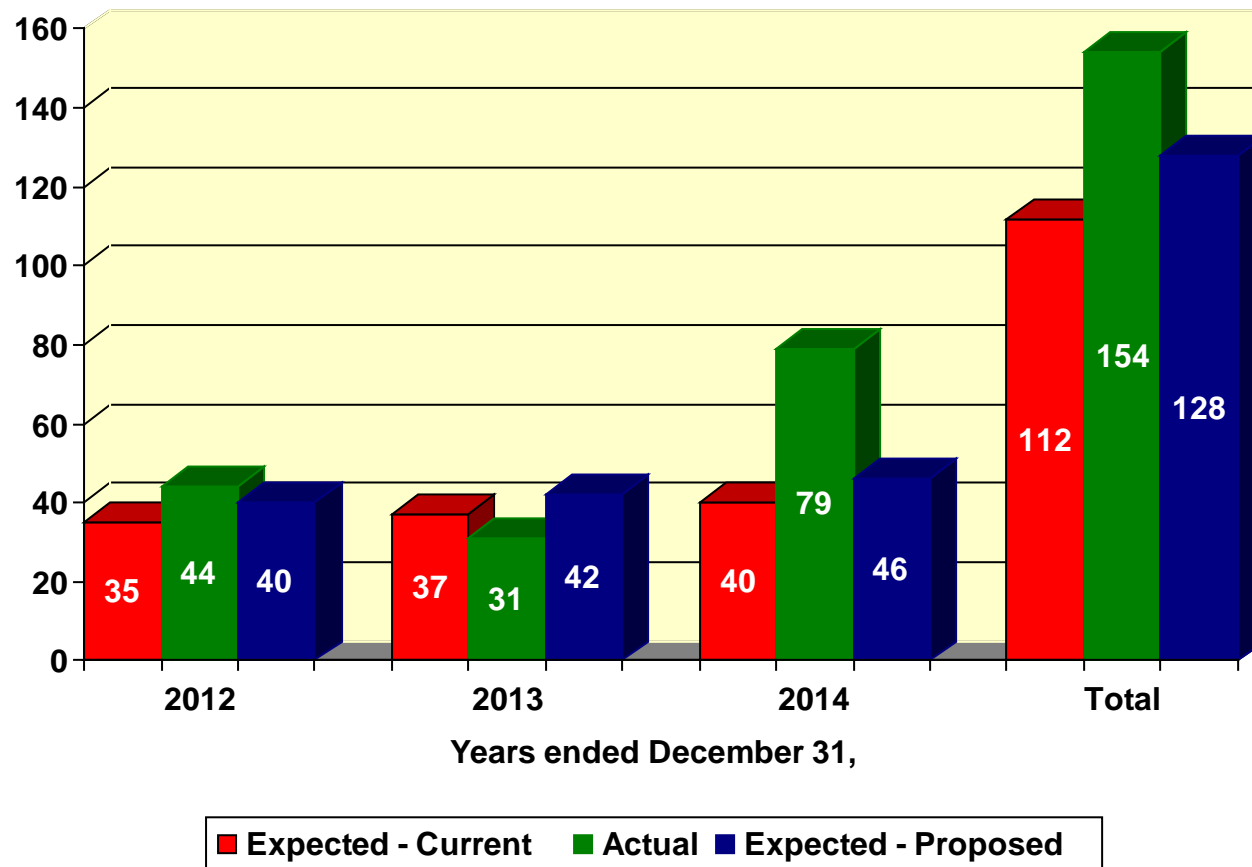


Chart 19
Termination Rates - General Members

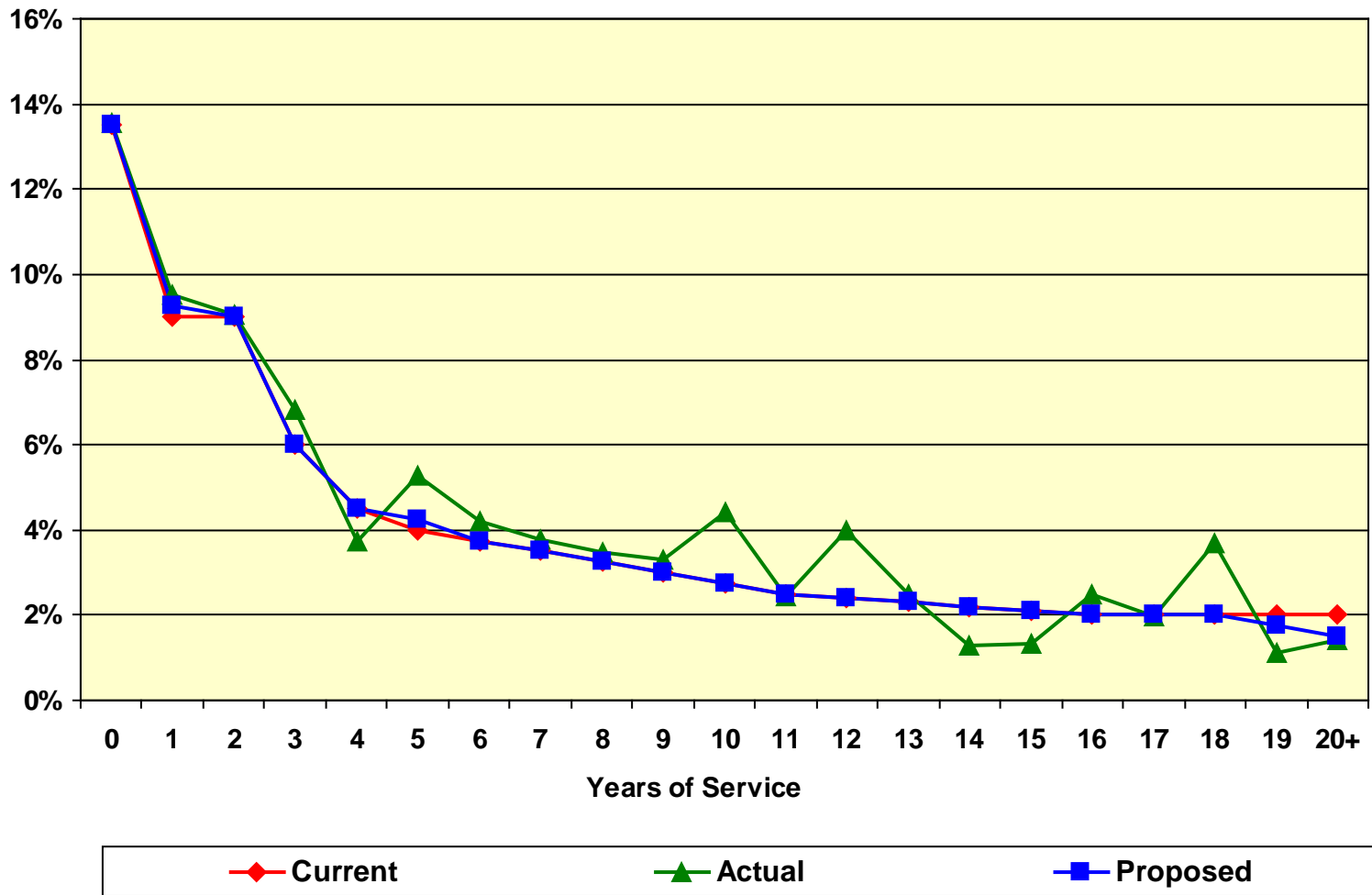
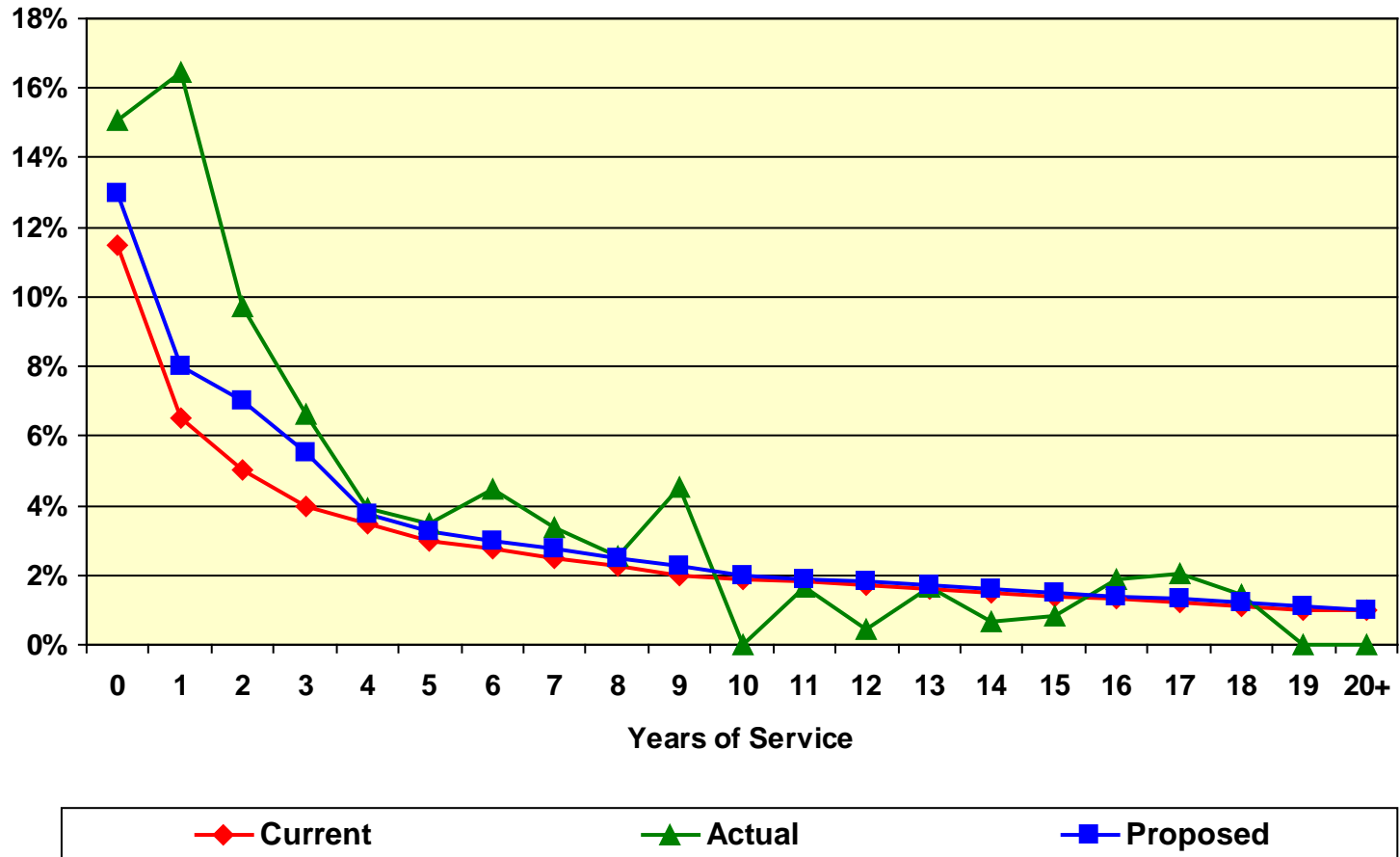


Chart 20
Termination Rates - Safety Members



F. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to at least a 50% of pay 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 combined service-connected and non-service connected disability incidence:

Rates of Disability Incidence (General Tier 1 and Tier 4)

Age	Current Rate*	Observed Rate*	Proposed Rate*
20 – 24	0.01%	0.00%	0.01%
25 – 29	0.02	0.00	0.02
30 – 34	0.05	0.00	0.05
35 – 39	0.10	0.00	0.10
40 – 44	0.20	0.39	0.30
45 – 49	0.40	0.00	0.40
50 – 54	0.60	0.97	0.60
55 – 59	0.70	0.25	0.60
60 – 64	0.70	0.00	0.60
65 – 69	0.70	0.00	0.60

* Total rates for service and non-service connected disabilities.

Rates of Disability Incidence (General Tier 3 and Tier 5)

Age	Current Rate*	Observed Rate*	Proposed Rate*
20 – 24	0.01%	0.00%	0.01%
25 – 29	0.02	0.00	0.02
30 – 34	0.04	0.00	0.04
35 – 39	0.06	0.00	0.06
40 – 44	0.10	0.08	0.10
45 – 49	0.15	0.16	0.15
50 – 54	0.18	0.09	0.16
55 – 59	0.23	0.17	0.22
60 – 64	0.30	0.48	0.32
65 – 69	0.40	0.00	0.32

* Total rates for service and non-service connected disabilities.

Rates of Disability Incidence (Safety)			
Age	Current Rate*	Observed Rate*	Proposed Rate*
20 – 24	0.10%	0.00%	0.10%
25 – 29	0.30	0.00	0.30
30 – 34	0.50	0.48	0.50
35 – 39	0.60	0.52	0.60
40 – 44	0.70	0.54	0.70
45 – 49	1.10	1.34	1.20
50 – 54	3.50	5.23	4.00
55 – 59	4.50	6.54	5.00
60 – 64	5.00	4.62	5.00

* Total rates for service and non-service connected disabilities.

Chart 21 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. Overall, there are decreases proposed for General Tier 1/Tier 4 and General Tier 3/Tier 5 and increases proposed for Safety.

Chart 22 shows actual disability rates, compared to the assumed and proposed rates for General Tier 1 and Tier 4 members. Since 57% of disabled General Tier 1 and Tier 4 members received a service connected disability, we recommend reducing the assumed proportion of members who will receive a service connected disability from 70% to 65%. The remaining 35% of General Tier 1 and Tier 4 disabled members will be assumed to receive a non-service connected disability.

Chart 23 graphs the same information as Chart 22, but for General Tier 3 and Tier 5 members. Since 24% of disabled General Tier 3 and Tier 5 members received a service connected disability, we recommend reducing the assumed proportion of members who will receive a service connected disability from 35% to 30%. The remaining 70% of General Tier 3 and Tier 5 disabled members will be assumed to receive a non-service connected disability.

Chart 24 graphs the same information as Charts 22 and 23, but for Safety members. Since 98% of disabled Safety members received a service connected disability, we recommend maintaining the current assumption that 100% of disabilities will receive a service connected disability retirement. This means that no non-service connected disabilities will be assumed for Safety members.

Chart 21
Actual Number of Disabilities Compared to Expected

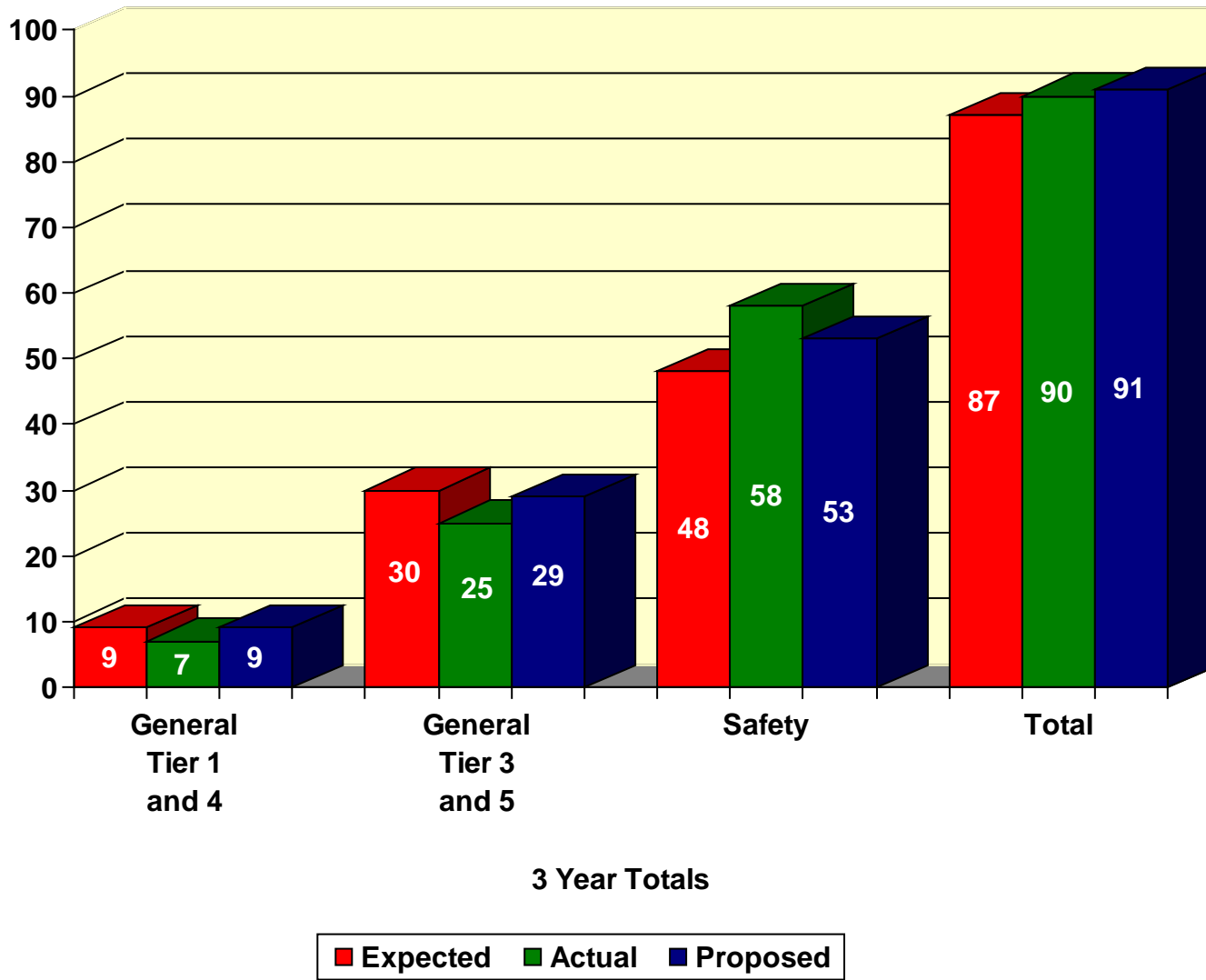


Chart 22
Disability Rates for General Tier 1 and Tier 4 Members

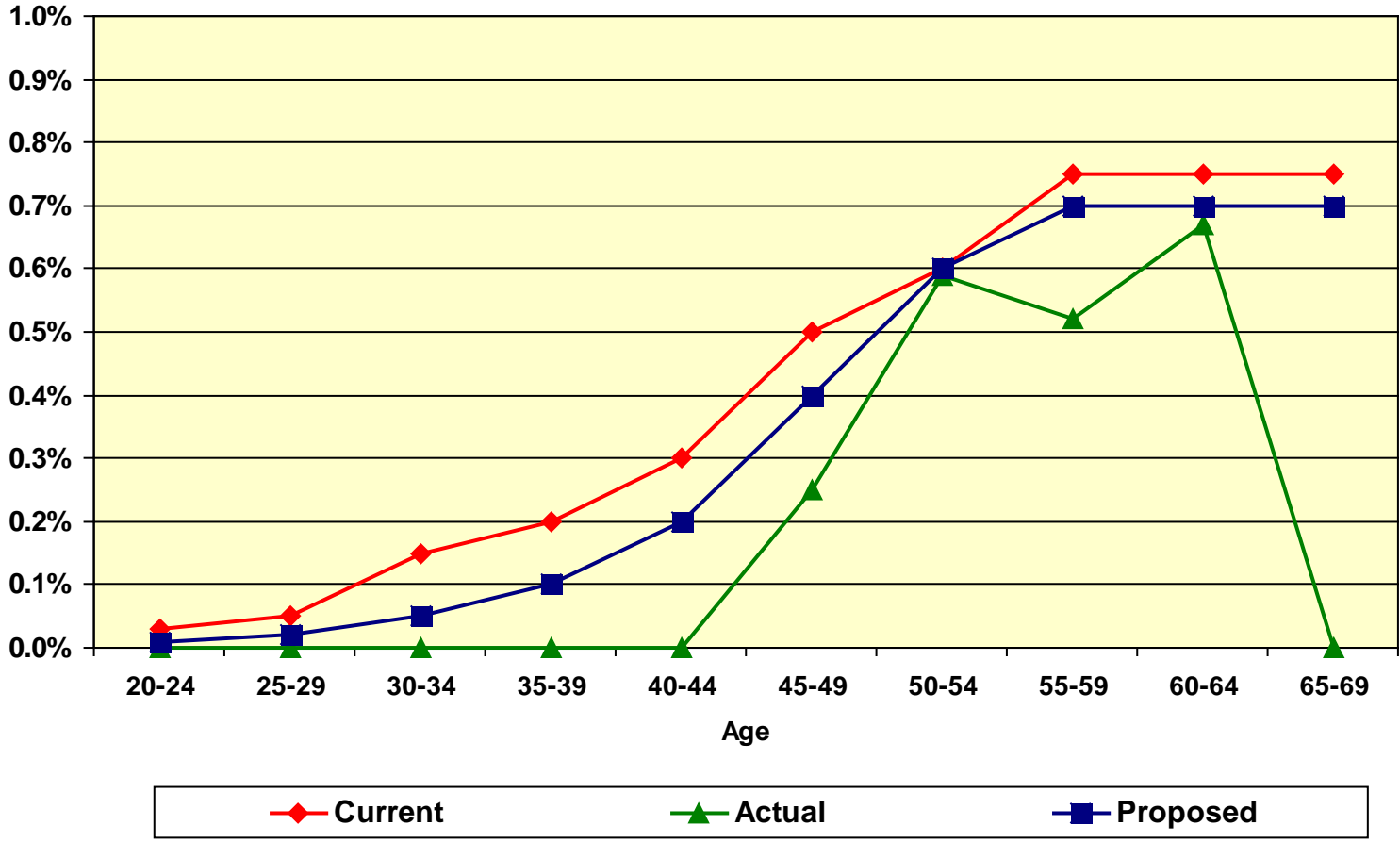


Chart 23
Disability Rates for General Tier 3 and Tier 5 Members

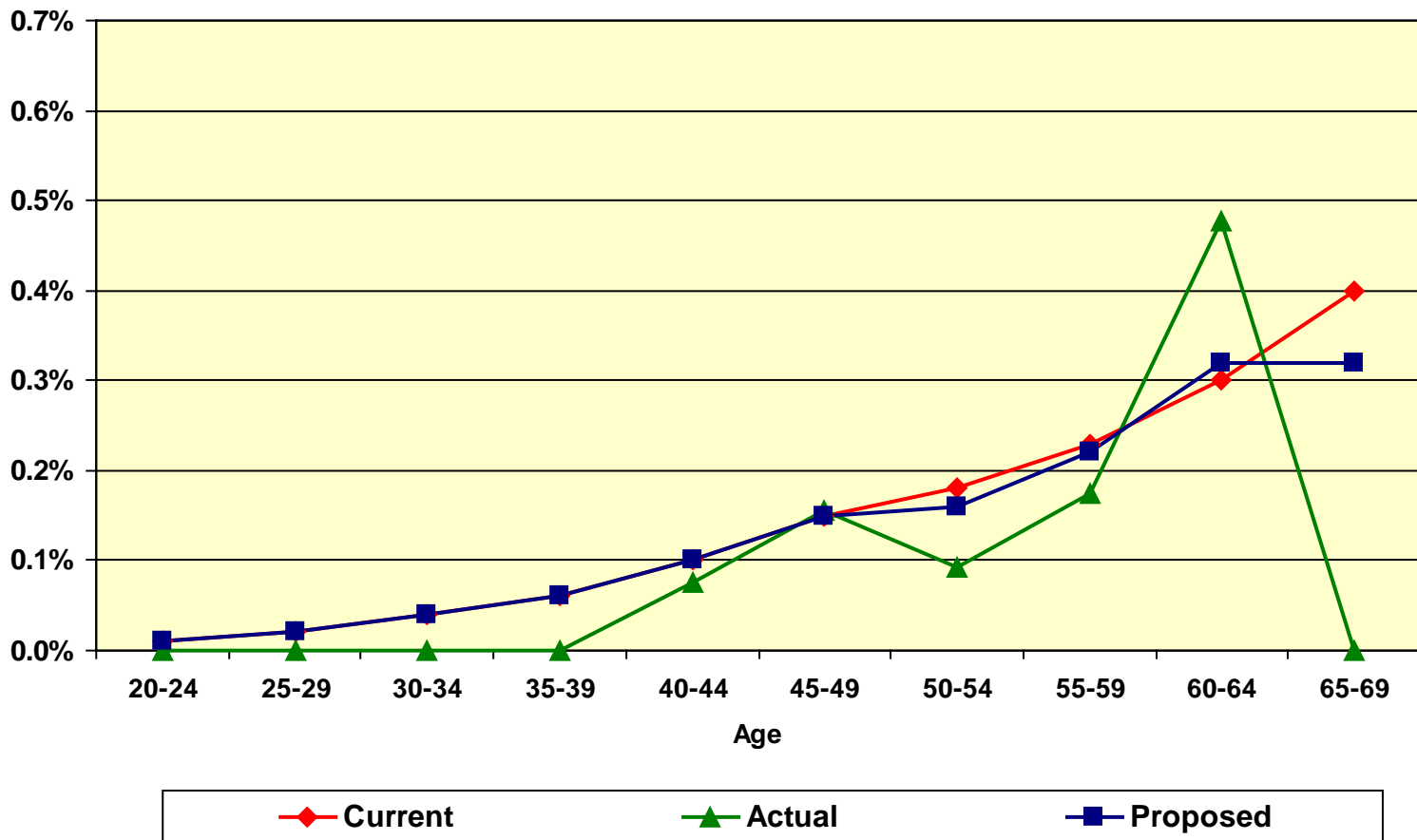
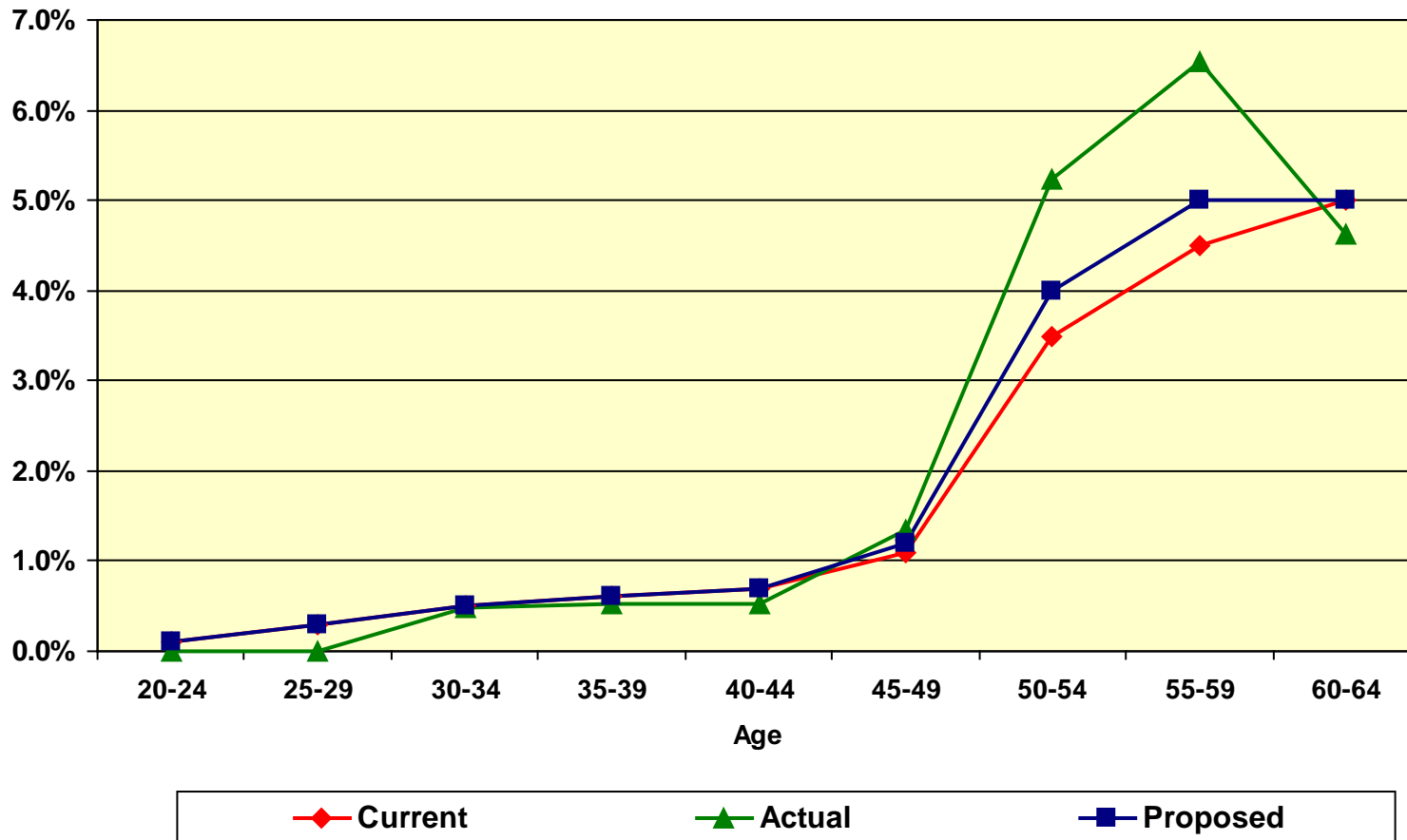


Chart 24
Disability Rates for Safety Members



G. PROMOTIONAL AND MERIT SALARY INCREASES

The Association'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
- Promotional and merit increases.

The inflationary increases are assumed to follow the general annual price inflation assumption discussed in our separate economic assumption report. The Retirement Board adopted a decrease in this assumption from 3.25% to 2.75% on April 27, 2016. The Board also adopted a decrease in the annual "across the board" real pay increase assumption from 0.75% to 0.50%. Therefore, the total assumed inflation and real "across the board" pay increase (i.e. wage inflation) decreases from 4.00% to 3.25%. This is the annual rate of payroll growth at which payments to amortize the Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase.

The annual promotional and merit increases are determined by measuring the actual increases received by members over the experience period, net of the actual average 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 increases of more than 50% or decreases of more than 25% 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 adopted 3.25% inflation and real “across the board” increase assumptions.

The following table shows the General members’ actual average promotional and merit increases by years of service over the three-year period from January 1, 2012 through December 31, 2014 along with the actual average increases based on the current three-year period and those shown in the prior experience study. The current and proposed assumptions are also shown. The actual increases for the most recent three-year period and the prior experience study 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 each of the three-year experience periods (0.3% and -0.4% respectively, on average).

General				
Years of Service	Current Assumptions	January 1, 2012 Through December 31, 2014 Average General Promotional and Merit Increases	Actual Average Increases from Current and Prior Study	Proposed Assumptions
Less than 1	9.50%	22.72%	21.75%	10.00%
1	6.50	7.12	9.92	7.25
2	4.75	5.95	6.23	5.25
3	3.25	4.38	4.92	3.75
4	2.25	3.67	4.12	2.75
5	1.50	3.28	3.28	2.25
6	1.25	2.84	2.88	1.75
7	1.00	2.26	2.35	1.50
8	0.75	2.12	1.92	1.25
9	0.75	2.45	2.39	1.20
10	0.75	2.90	2.77	1.15
11	0.75	1.54	1.61	1.10
12	0.75	1.79	1.72	1.00
13	0.75	1.46	1.49	0.90
14	0.75	1.53	1.90	0.80
15	0.75	1.96	1.88	0.75
16	0.75	1.20	1.54	0.75
17	0.75	1.26	1.44	0.75
18	0.75	1.33	1.68	0.75
19	0.75	1.67	1.88	0.75
20 or more	0.75	1.08	1.21	0.75

The following table provides the same information for Safety members. The actual average promotional and merit 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) for each year over each of the three-year experience periods (-0.8% and -0.9% respectively, on average). Since the actual increases were reduced by negative numbers, this results in an addition to the actual promotional and merit increases.

Safety

Years of Service	Current Assumptions	January 1, 2012 Through December 31, 2014 Average Safety Promotional and Merit Increases	Actual Average Increases from Current and Prior Study	Proposed Assumptions
Less than 1	10.00%	24.38%	20.86%	10.50%
1	6.50	7.65	9.83	7.25
2	5.25	6.58	6.54	5.75
3	4.00	5.07	5.18	4.50
4	2.25	2.45	3.18	3.00
5	1.00	2.48	2.51	1.75
6	0.75	2.14	1.94	1.25
7	0.75	1.68	1.58	1.20
8	0.75	1.84	1.67	1.15
9	0.75	1.94	1.76	1.10
10	0.75	1.57	1.73	1.05
11	0.75	2.22	1.90	1.00
12	0.75	1.94	1.66	0.95
13	0.75	2.17	1.69	0.85
14	0.75	3.01	2.46	0.80
15	0.75	3.02	2.83	0.75
16	0.75	1.78	2.25	0.75
17	0.75	1.58	1.83	0.75
18	0.75	1.80	1.94	0.75
19	0.75	2.92	2.49	0.75
20 or more	0.75	2.66	2.40	0.75

Charts 25 and 26 provide a graphical comparison of the actual promotional and merit increases, compared to the proposed assumptions. The charts also show the actual promotional and merit increases based on an average of both the current and previous experience periods. This is discussed below. Chart 25 shows this information for General members and Chart 26 is for Safety members.

We realize that the most recent and the prior experience study period may not be indicative of typical future long-term promotional and merit salary increases. This appears to be the case for both General and Safety members as they received no “across the board” salary increases (based on the decrease in average wages). Note that in this situation our model may lead to higher estimated promotional and merit increases. Accordingly, in our proposed changes to the promotional and merit increases, we have given relatively less weight to the actual average increase experience during the last two studies.

Based on this experience, we are proposing overall increases in the promotional and merit salary increases for both General and Safety members. Overall, salary increases are assumed to be lower for both General and Safety members due to the lower price inflation and real “across the board” pay increases assumption.

Chart 25
Promotional and Merit Salary Increase Rates -
General Members

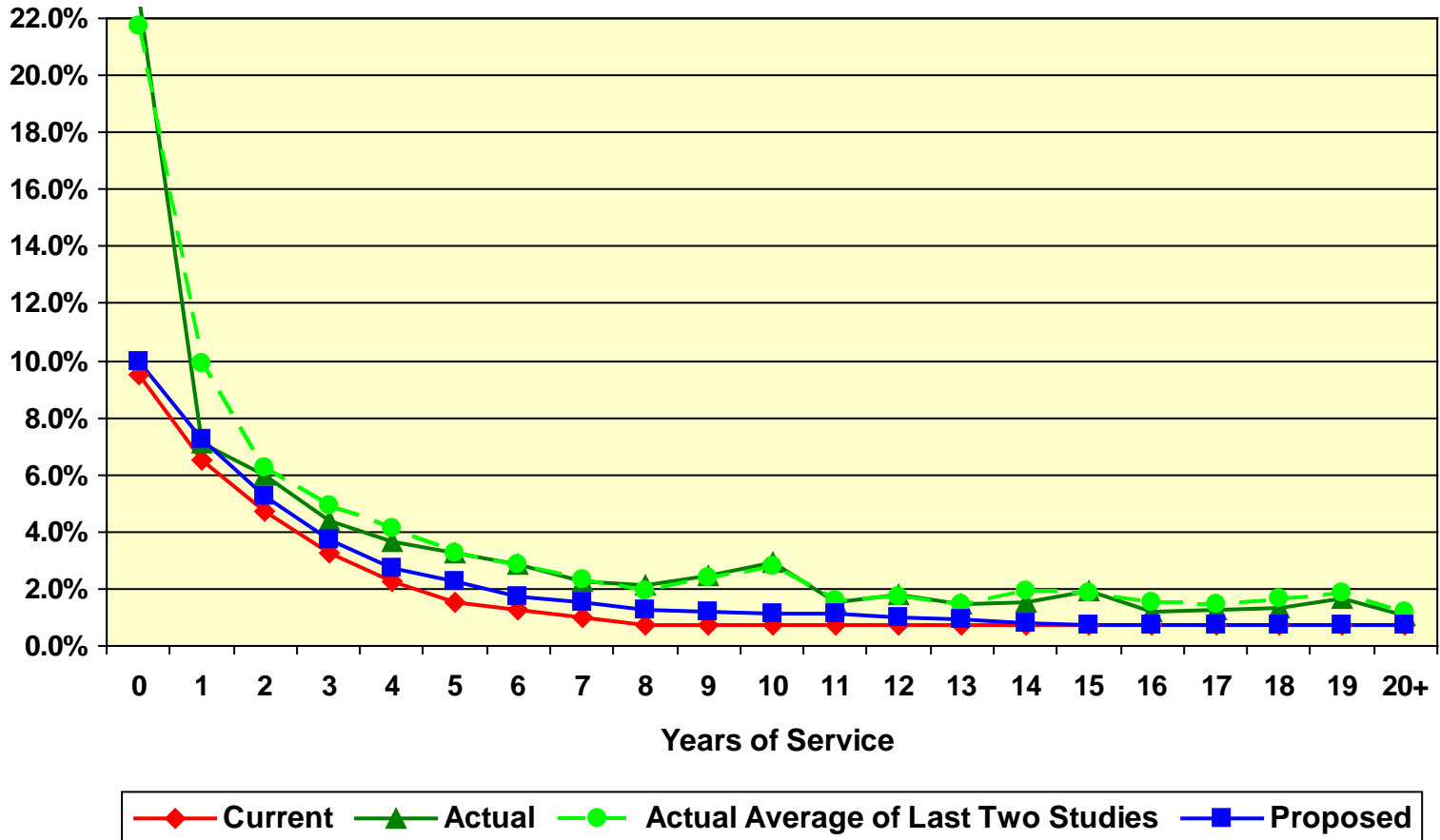
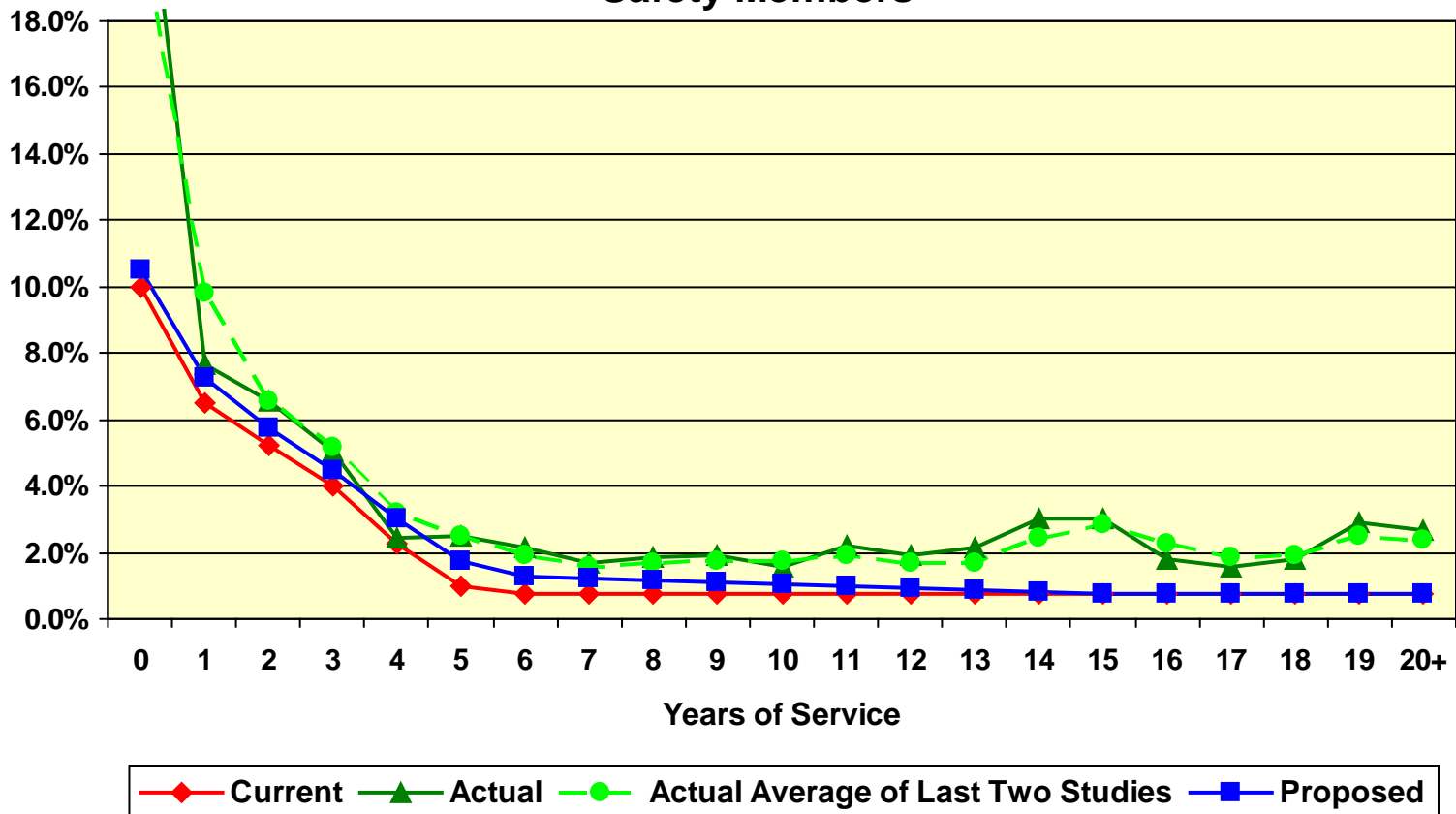


Chart 26
Promotional and Merit Salary Increase Rates -
Safety Members



H. LEAVE CASHOUTS

In 1998, the Board of Retirement, in the course of actions related to the Paulson Settlement, determined that several additional pay elements should be included as Earnable Compensation. 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
- Leave Cashout 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 a separate actuarial assumption to anticipate its impact on a member’s retirement benefit. Note that members in the PEPRA tiers do not have a leave cashout assumption, because leave cashout elements are not included in pensionable compensation under the PEPRA formulas.

AB 197 required CCCERA to implement a policy where certain terminal pay elements are no longer included in the determination of compensation for retirement purposes. This applies to all legacy tiers. In addition, the Board decided to discontinue “straddling” where employees could time their leave cashouts so that two leave cashouts would occur during their 12-month final average earnings period. The Board decided that only one such payment should be included on a prospective basis. We reviewed this assumption for the December 31, 2013 valuation in order to reflect AB 197 and the discontinuation of “straddling”. We also recommended an assumption change to Safety Tier C in the December 31, 2014 valuation to reflect the most recent Memorandum of Understanding (MOU) and Resolutions applicable to employees in that tier.

In this study, we have collected data for the last three years to estimate leave cashouts for non-PEPRA members as a percentage of current pay. The results are summarized in the table that follows (which is followed by a key showing the employers in each cost group). This information reflects the hypothetical impact of AB 197 and the discontinuation of “straddling”.

Based on the data in the table, we are recommending adjustments in the leave cashout assumptions for the December 31, 2015 valuation for most cost groups. Overall, the leave cashout assumptions are slightly lower under the new assumptions. The cost of this pay element is recognized in the valuation as an employer and member cost in both the basic and COLA components.

Leave Cashout as a Percentage of Final Average Pay (Excluding Such Leave Cashout) by Cost Group

Year	Cost Group #1	Tier 2 Cost Group #2	Tier 3 Cost Group #2	Cost Group #3	Cost Group #4	Cost Group #5	Cost Group #6	Cost Group #7	Cost Group #8	Cost Group #9	Cost Group #10	Cost Group #11	Cost Group #12			
	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout	Average Leave Cashout			
2012	0.95%	0.64%	0.83%	8.40%	0.41%	1.91%	0.00%	0.60%	0.28%	0.00%	0.00%	3.35%	3.03%			
2013	0.64%	0.23%	0.42%	1.22%	3.43%	0.00%	0.00%	2.16%	1.39%	0.00%	0.00%	0.39%	0.00%			
2014	<u>1.79%</u>	<u>0.65%</u>	<u>1.37%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.96%</u>	<u>1.36%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>1.38%</u>	<u>0.00%</u>			
Average	1.09%	0.55%	0.89%	5.18%	0.89%	0.48%	0.00%	1.20%	0.80%	0.00%	0.00%	2.27%	1.82%			
Retiring Member Count																
2012	53	210	306	28	5	1	1	49	25	0	5	19	3			
2013	31	101	145	11	2	0	0	40	6	1	2	9	2			
<u>2014</u>	<u>30</u>	<u>131</u>	<u>179</u>	<u>9</u>	<u>3</u>	<u>3</u>	<u>0</u>	<u>39</u>	<u>17</u>	<u>0</u>	<u>3</u>	<u>4</u>	<u>0</u>			
Total	114	442	630	48	10	4	1	128	48	1	10	32	5			
Current Assumptions	1.50%	0.50%	0.75%	6.50%	0.25%	Applies to all non-PEPRA members								1.50%	3.00%	3.50%
Proposed Assumptions	1.25%	0.50%	1.00%	5.50%	0.50%	Applies to all non-PEPRA members								1.00%	2.50%	2.50%

For retiring members with service in more than one tier, their Leave Cashout is determined separately for each tier's benefit and these amounts are allocated to each applicable cost group separately in this exhibit.

Summary of Cost Groups and Employers

GENERAL

Cost Group	Employer Name	Benefit Structure
(1)	County General	Tier 1 Enhanced/PEPRA Tier 4
	Local Agency Formation Commission	Tier 1 Enhanced/PEPRA Tier 4
	Contra Costa Mosquito and Vector Control District	Tier 1 Enhanced/PEPRA Tier 4
	Bethel Island Municipal District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
	First 5-Children & Families Commission	Tier 1 Enhanced/PEPRA Tier 4
	Contra Costa County Employees' Retirement Association	Tier 1 Enhanced/PEPRA Tier 4
	Superior Court	Tier 1 Enhanced/PEPRA Tier 4
	East Contra Costa Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
	Moraga-Orinda Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
	Rodeo-Hercules Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
	San Ramon Valley Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
(2)	County General	Tier 3 Enhanced/PEPRA Tier 5
	In-Home Supportive Services Authority	Tier 3 Enhanced/PEPRA Tier 5
	Contra Costa Mosquito and Vector Control District	Tier 3 Enhanced/PEPRA Tier 5
	Superior Court	Tier 3 Enhanced/PEPRA Tier 5
(3)	Central Contra Costa Sanitary District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
(4)	Contra Costa Housing Authority	Tier 1 Enhanced/PEPRA Tier 4
(5)	Contra Costa County Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4
(6)	Rodeo Sanitary District	Tier 1 Non-Enhanced/PEPRA Tier 4
	Byron Brentwood Cemetery	Tier 1 Non-Enhanced/PEPRA Tier 4

Summary of Cost Groups and Employers (continued)

SAFETY

Cost Group	Employer Name	Benefit Structure
(7)	County Safety	Tier A Enhanced/PEPRA Tier D
(8)	Contra Costa County Fire Protection District East Contra Costa Fire Protection District	Tier A Enhanced/PEPRA Tier D/E Tier A Enhanced/PEPRA Tier D
(9)	County Safety	Tier C Enhanced/PEPRA Tier E (Members hired on or after January 1, 2007)
(10)	Moraga-Orinda Fire District	Tier A Enhanced/PEPRA Tier D
(11)	San Ramon Valley Fire District	Tier A Enhanced/PEPRA Tier D
(12)	Rodeo-Hercules Fire Protection District	Tier A Non-Enhanced/PEPRA Tier D

I. SERVICE FROM UNUSED SICK LEAVE CONVERSION

At retirement, members can convert their unused sick leave to increase the service credit used in the calculation of their retirement benefit. The actuarial valuation anticipates this additional benefit using an assumption to estimate the proportional increase in service that will occur due to unused sick leave conversions.

In this study, we have collected data for the last three years to estimate sick leave converted to service credit as a percentage of total service credit (before including the sick leave converted to service credit) at retirement separately for General and Safety members as well as non-disabled and disabled members. The results are summarized in the following table:

Year	Non-Disabled Retirees		Disabled Retirees	
	General	Safety	General	Safety
2012	1.09%	1.76%	0.09%	1.84%
2013	0.74%	1.81%	0.01%	1.01%
2014	<u>0.94%</u>	<u>1.87%</u>	<u>0.07%</u>	<u>1.19%</u>
Weighted Average	0.95%	1.81%	0.06%	1.37%
Current Assumption	1.25%	2.00%	0.10%	1.25%
Proposed Assumption	1.20%	1.90%	0.08%	1.30%

Based on the data in the above table, we recommend that the current sick leave conversion assumptions be decreased for General non-disabled members, Safety non-disabled members, and General disabled members. We also recommend an increase in this assumption for Safety disabled members.

Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.

IV. COST IMPACT OF ASSUMPTION CHANGES

The table on the following page shows the cost impact of proposed demographic assumption changes and the proposed explicit administrative expense load as if they were applied in the December 31, 2014 actuarial valuation along with the cost impact of changes in economic assumptions already adopted by the Board. If all of the proposed demographic assumption changes were implemented, the Plan's average employer rate would have increased by 2.87% of compensation. The average member rate would have increased by 0.53% of compensation. Of the various demographic assumption changes, the most significant cost impact is from the change to use generational mortality tables.

The estimated cost impact of the economic assumptions previously adopted by the Board in April was a decrease of 1.18% of compensation for the average employer rate and 0.67% of compensation for the average member rate.

The estimated cost impact of the proposed change to an explicit administrative expense load is an increase of 0.77% of compensation for the employer rates and 0.23% of compensation for the member rates. As discussed in the economic assumptions report, the cost associated with the administrative expense load has been allocated to both the employer and the member based on the components of the total contribution rate (before expenses) for the member and the employer.

Therefore, the estimated cost impact of all adopted and proposed assumption changes (including demographic, economic and explicit administrative expense load) is an increase of 2.46% of compensation for the average employer rate, where the Normal Cost rate increased by 0.13%, the UAAL amortization rate increased by 1.56% and the explicit administrative expense load is 0.77%. The estimated increase in the average member rate is 0.09% of compensation, including the explicit administrative load of 0.23%.

The estimated increase in the Plan's Unfunded Actuarial Accrued Liability is \$86.8 million, which would cause the funded ratio to decrease from 81.7% to 80.8%.

Charts 27 through 38 show the member contribution rates from the December 31, 2014 actuarial valuation along with the member rates based on the proposed assumptions for legacy tiers. The member contribution rates for PEPRAs tiers are shown following the charts.

Summary of Key Valuation Results as of December 31, 2014

Average Employer Contribution Rates ⁽¹⁾ :	Current Assumptions		Proposed Assumptions	
	Total Rate	Estimated Annual Amount	Total Rate	Estimated Annual Amount
General				
Cost Group #1 – County and Small Districts (Tier 1 and 4)	33.14%	\$7,471,910	34.61%	\$7,761,228
Cost Group #2 – County and Small Districts (Tier 3 and 5)	29.36%	147,184,037	30.99%	154,802,596
Cost Group #3 – Central Contra Costa Sanitary District	55.71%	15,653,379	57.01%	15,960,439
Cost Group #4 – Contra Costa Housing Authority	41.76%	2,138,471	43.53%	2,220,449
Cost Group #5 – Contra Costa County Fire Protection District	31.59%	1,124,433	33.29%	1,179,493
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	26.62%	220,891	27.48%	227,356
Safety				
Cost Group #7 – County (Tier A and D)	77.77%	47,801,788	83.45%	51,033,855
Cost Group #8 – Contra Costa and East Fire Protection Districts	78.93%	24,149,147	86.58%	26,374,693
Cost Group #9 – County (Tier C and E)	70.63%	13,024,297	76.99%	14,178,590
Cost Group #10 – Moraga-Orinda Fire District	69.66%	4,887,061	75.29%	5,263,799
Cost Group #11 – San Ramon Valley Fire District	83.79%	13,965,831	87.68%	14,529,633
Cost Group #12 – Rodeo-Hercules Fire Protection District	89.27%	1,977,156	94.69%	2,087,564
All Employers combined	40.06%	\$279,598,401	42.52%	295,619,694
Average Member Contribution Rates⁽¹⁾:		Estimated		Estimated
General	Total Rate	Annual Amount	Total Rate	Annual Amount
Cost Group #1 – County and Small Districts (Tier 1 and 4)	10.63%	\$2,396,574	10.55%	\$2,365,818
Cost Group #2 – County and Small Districts (Tier 3 and 5)	10.54%	52,834,487	10.69%	53,399,153
Cost Group #3 – Central Contra Costa Sanitary District	11.65%	3,273,422	11.52%	3,225,123
Cost Group #4 – Contra Costa Housing Authority	10.95%	560,790	11.04%	563,146
Cost Group #5 – Contra Costa County Fire Protection District	10.86%	386,572	10.77%	381,590
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	12.37%	102,637	12.41%	102,674
Safety				
Cost Group #7 – County (Tier A and D)	17.52%	10,768,805	17.48%	10,689,896
Cost Group #8 – Contra Costa and East Fire Protection Districts	17.19%	5,259,475	17.05%	5,193,908
Cost Group #9 – County (Tier C and E)	14.08%	2,596,473	14.74%	2,714,540
Cost Group #10 – Moraga-Orinda Fire District	17.10%	1,199,666	16.90%	1,181,541
Cost Group #11 – San Ramon Valley Fire District	17.28%	2,880,327	16.90%	2,800,534
Cost Group #12 – Rodeo-Hercules Fire Protection District	16.16%	357,914	16.04%	353,623
All Categories Combined	11.84%	\$82,617,142	11.93%	\$82,971,544

⁽¹⁾ Based on projected payroll of \$697,831,837 under the current assumptions and \$695,217,574 under the proposed assumptions. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions. The rates shown are averages based on all members regardless of their membership date.

Note: Pages 60 and 61 contain a summary that shows which employers are in each cost group.

Chart 27
General Cost Group #1 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

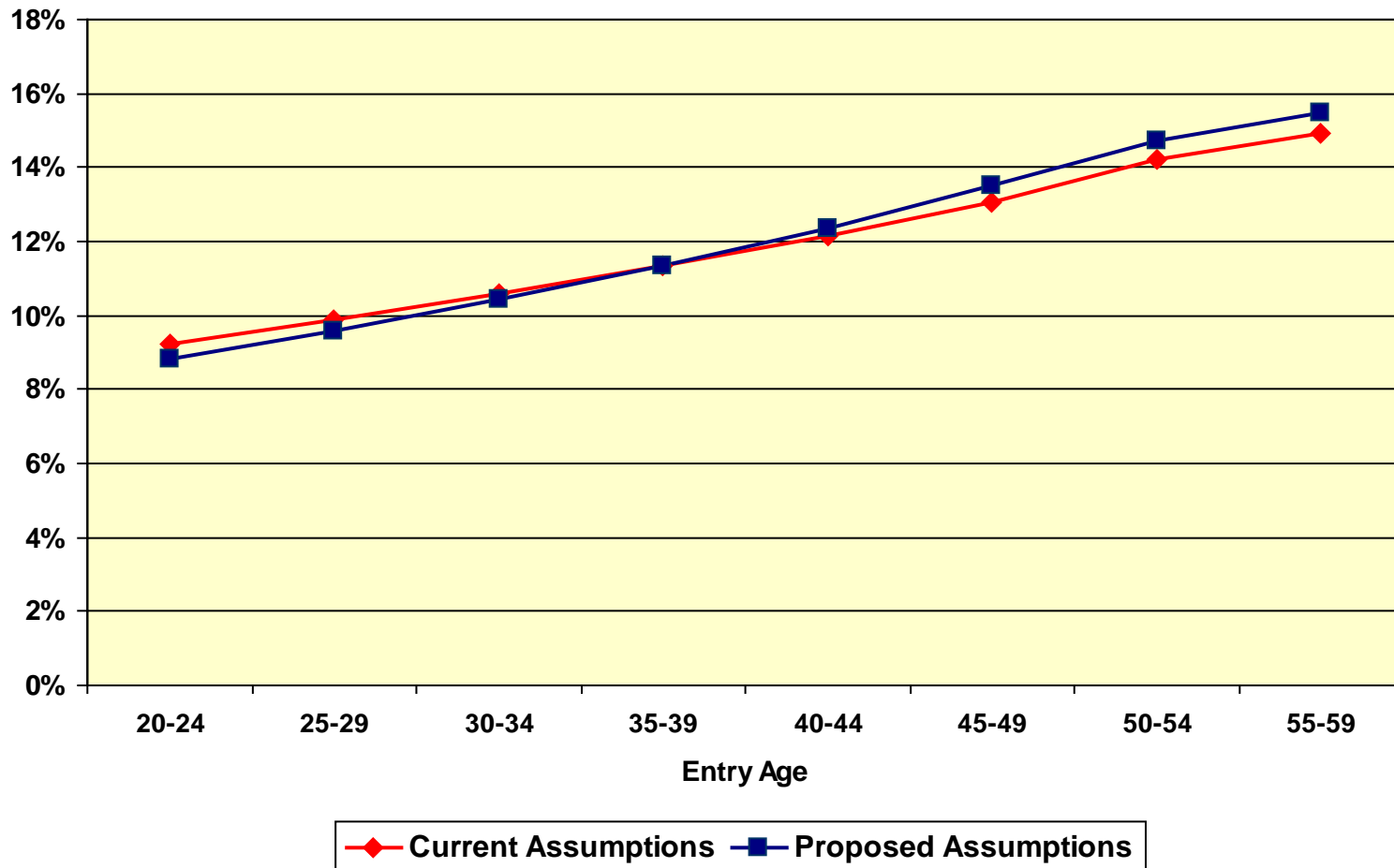


Chart 28
General Cost Group #2 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

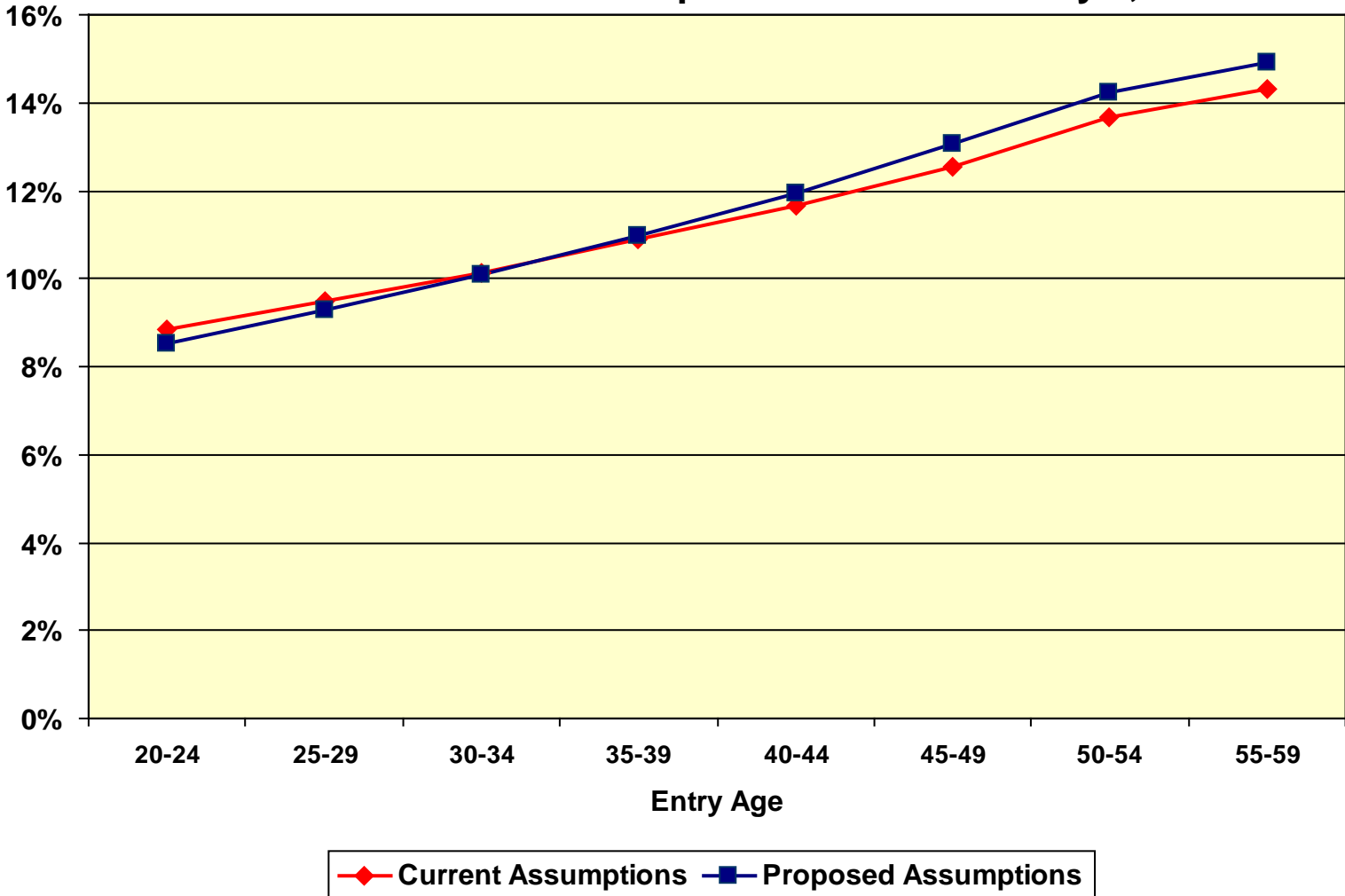


Chart 29
General Cost Group #3 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

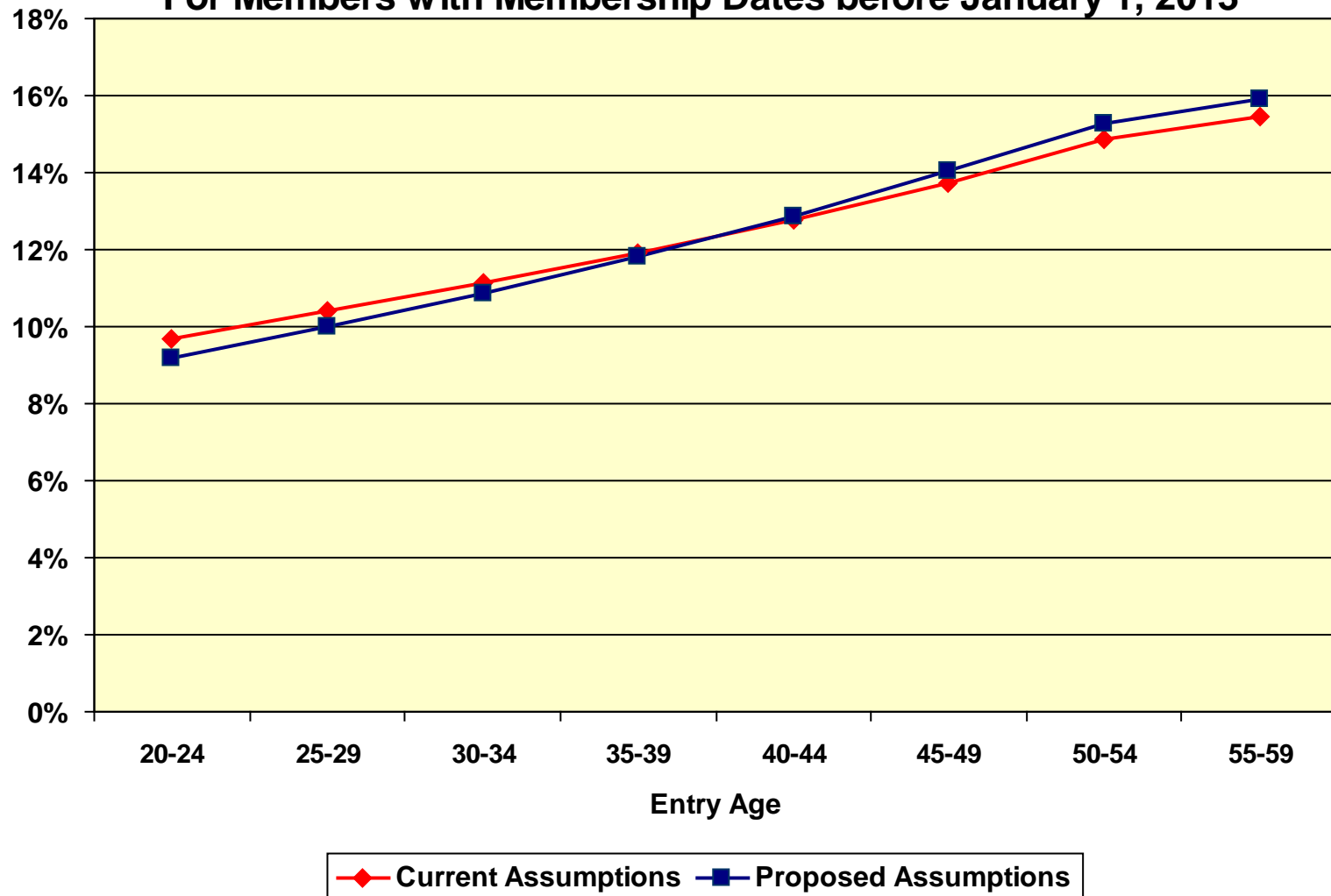


Chart 30
General Cost Group #4 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

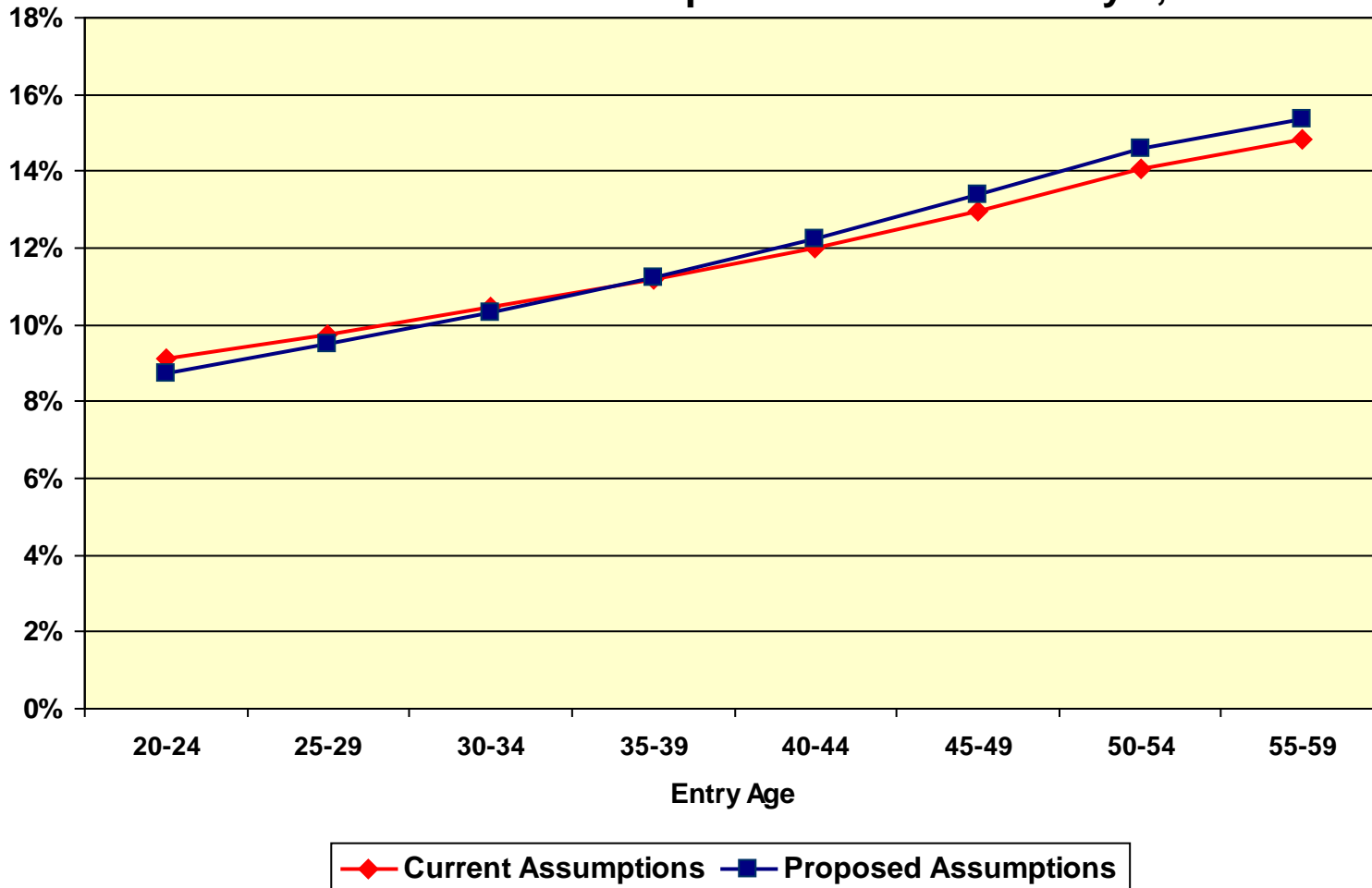


Chart 31
General Cost Group #5 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

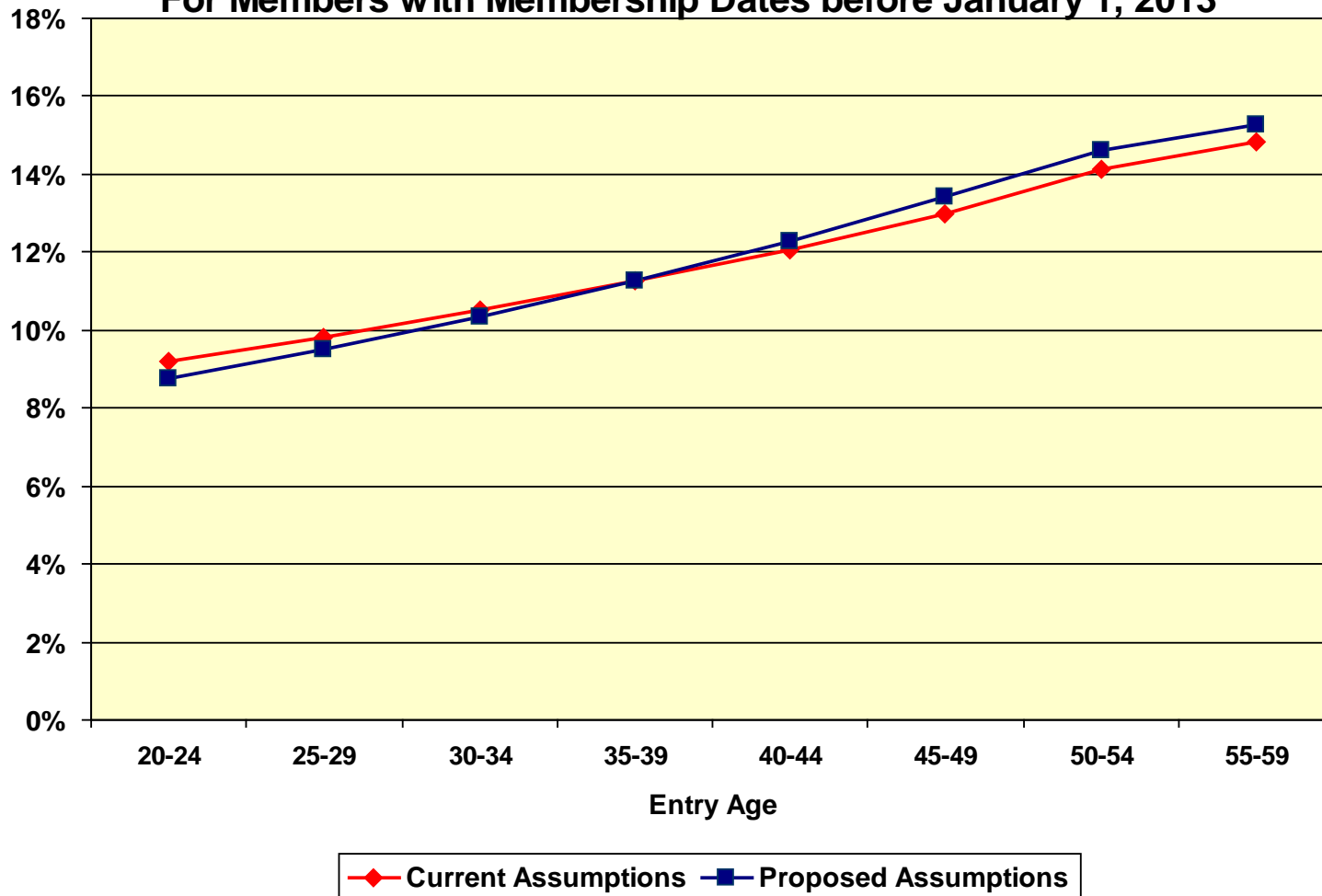


Chart 32
General Cost Group #6 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

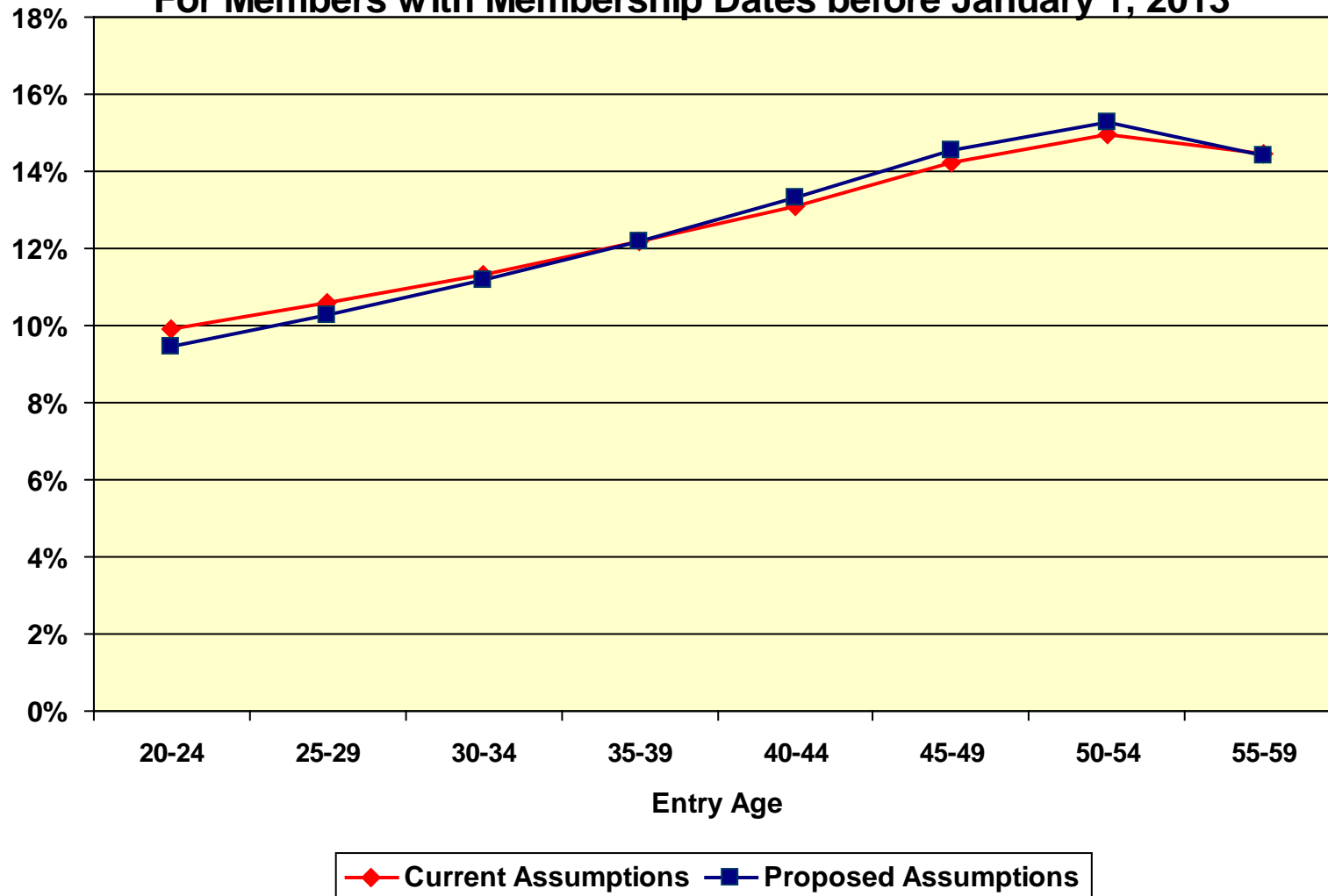


Chart 33
Safety Cost Group #7 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

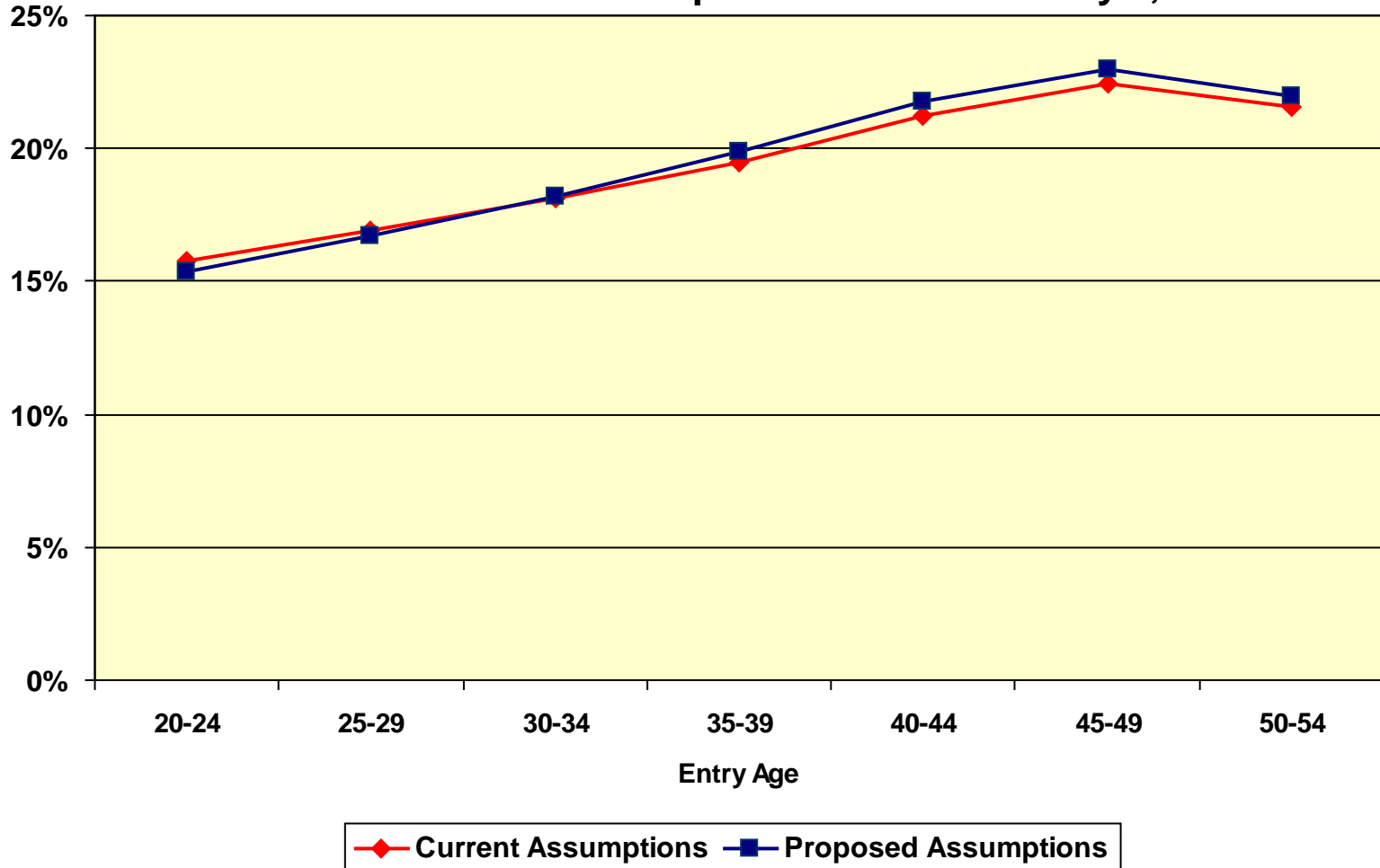


Chart 34
Safety Cost Group #8 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

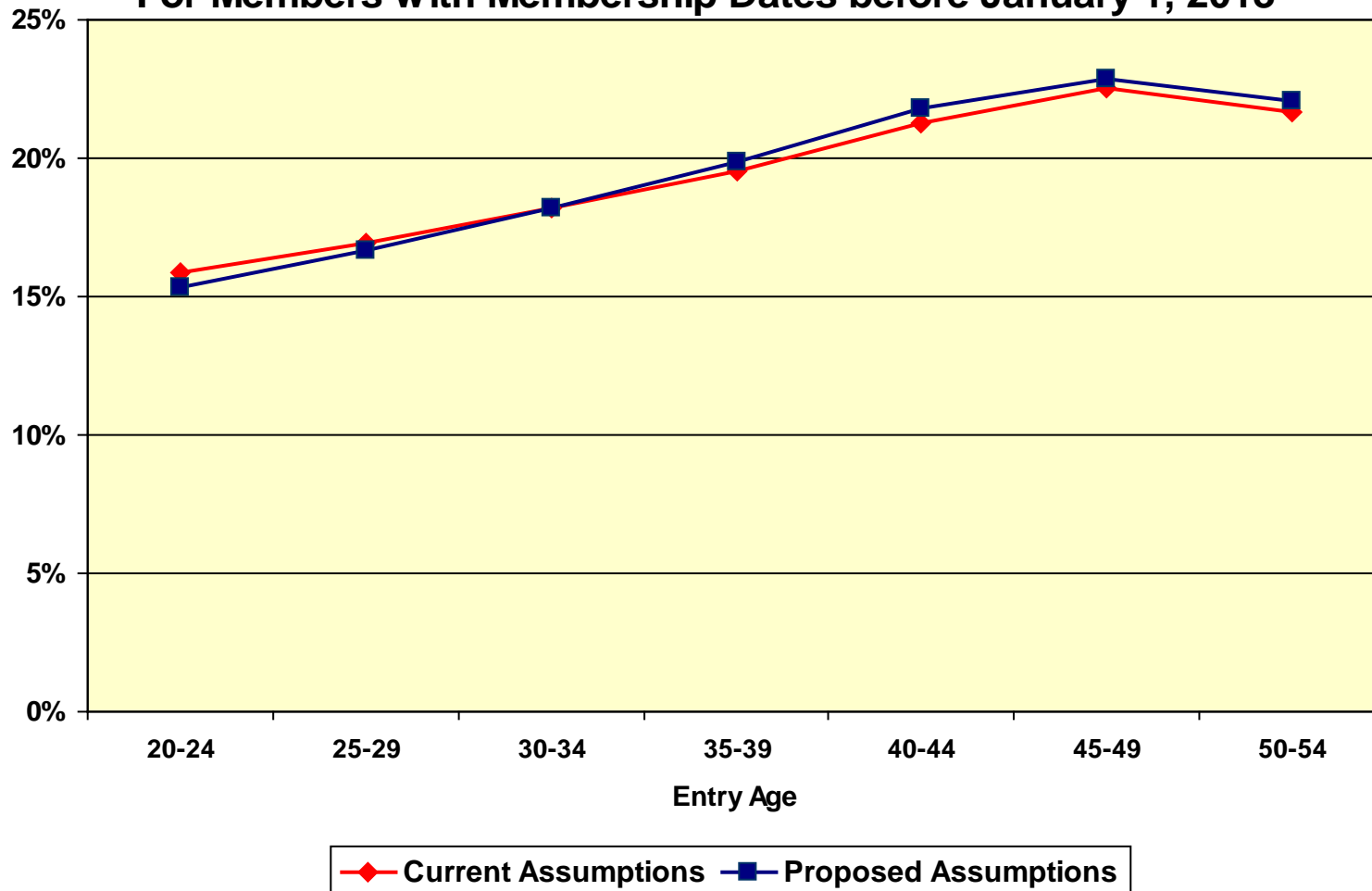


Chart 35
Safety Cost Group #9 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

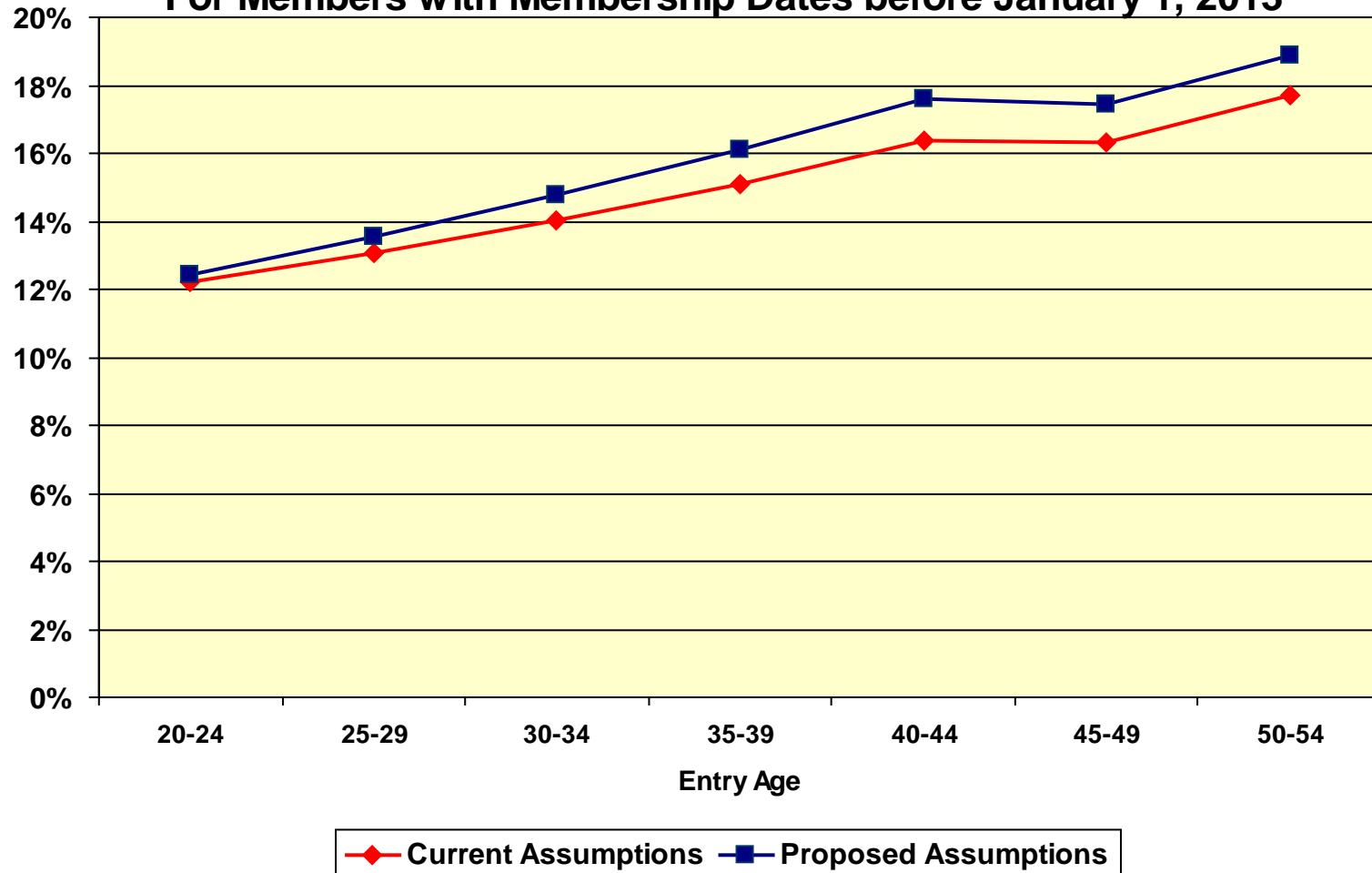


Chart 36
Safety Cost Group #10 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

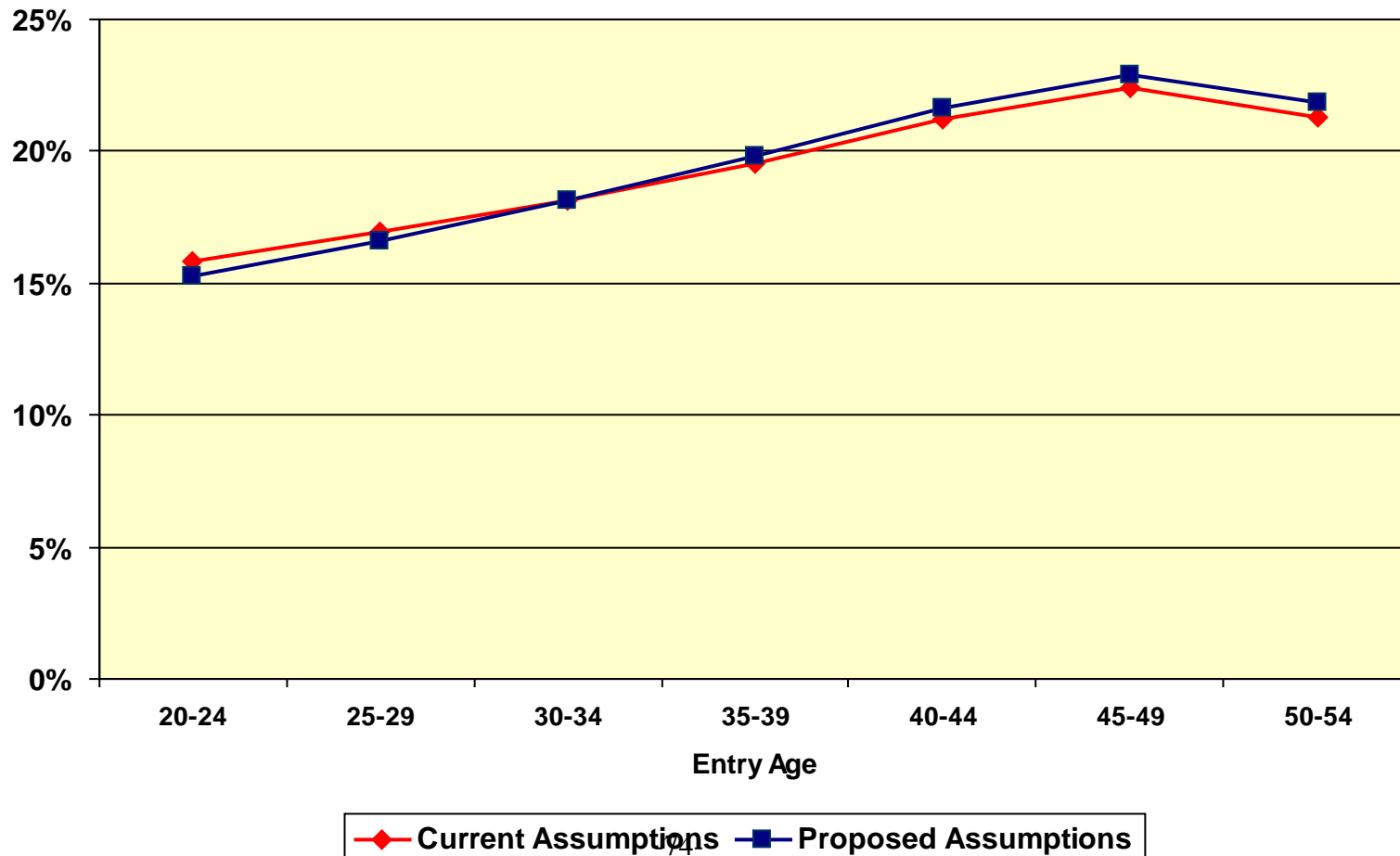


Chart 37
Safety Cost Group #11 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013

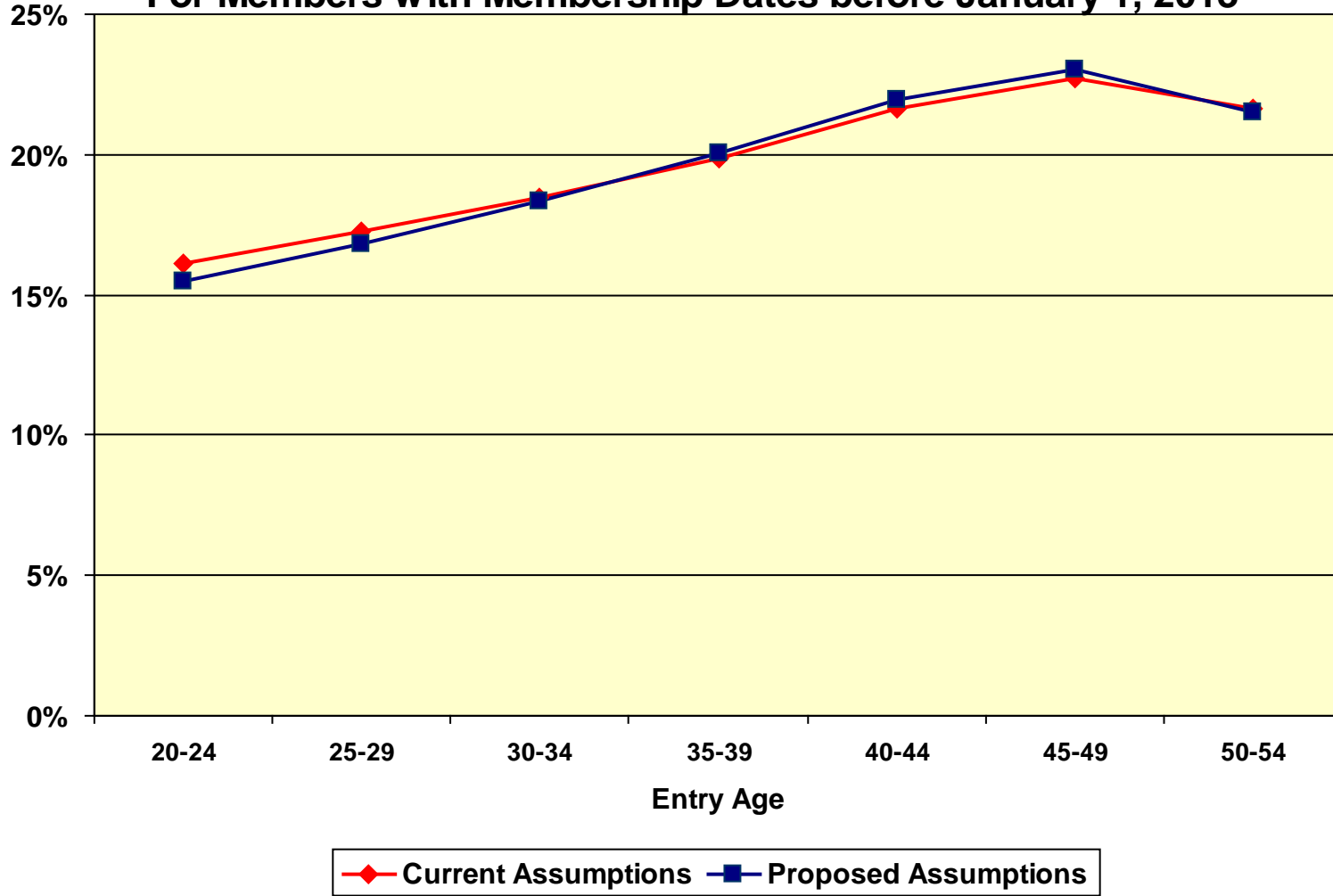
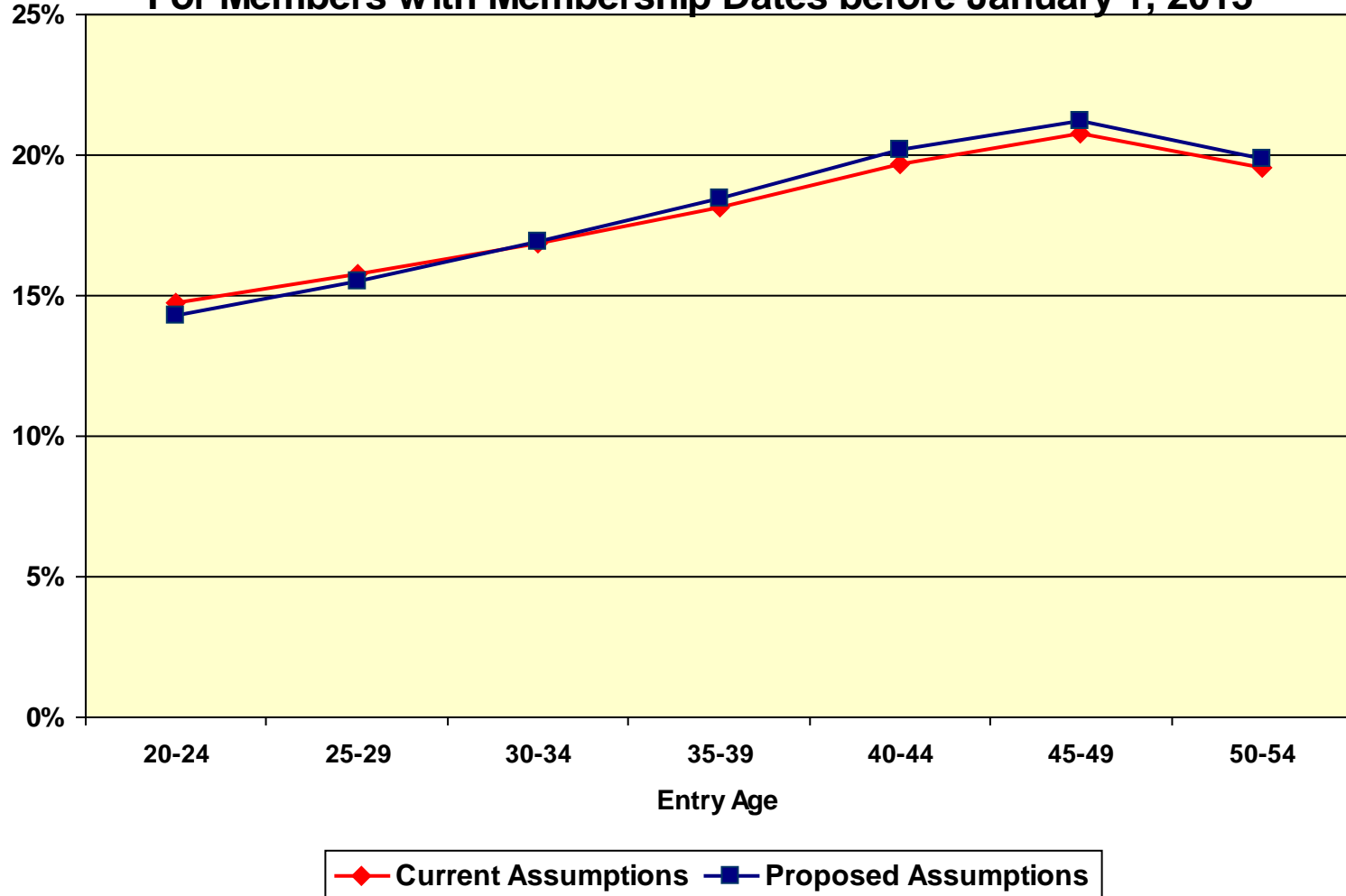


Chart 38
Safety Cost Group #12 Members' Contribution Rates
For Members with Membership Dates before January 1, 2013



Member Contribution Rates for Members with Membership Dates on or after January 1, 2013

**Member Contribution Rates for Members with Membership Dates on or after January 1, 2013
(Expressed as a Percentage of Monthly Payroll)**

	<u>Current Assumptions</u>	<u>Proposed Assumptions</u>
Cost Group #1 – PEPRA Tier 4 (2% COLA)	10.01%	10.65%
Cost Group #1 – PEPRA Tier 4 (3% COLA)	10.94%	11.35%
Cost Group #2 - PEPRA Tier 5 (2% COLA)	8.73%	9.32%
Cost Group #2 - PEPRA Tier 5 (3%/4% COLA)	10.39%	10.86%
Cost Group #3 - PEPRA Tier 4 (3% COLA)	12.06%	12.35%
Cost Group #4 - PEPRA Tier 4 (3% COLA)	9.60%	10.02%
Cost Group #5 - PEPRA Tier 4 (2% COLA)	8.58%	9.20%
Cost Group #5 - PEPRA Tier 4 (3% COLA)	14.14%	14.40%
Cost Group #6 - PEPRA Tier 4 (3% COLA)	11.65%	12.06%
Cost Group #7 - PEPRA Tier D	22.68%	23.91%
Cost Group #8 - PEPRA Tier D	19.65%	20.45%
Cost Group #8 - PEPRA Tier E	15.95%	16.95%
Cost Group #9 - PEPRA Tier E	16.32%	17.34%
Cost Group #10 - PEPRA Tier D	18.10%	18.68%
Cost Group #11 - PEPRA Tier D	18.65%	19.26%
Cost Group #12 - PEPRA Tier D	16.53%	16.92%

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2015 is equal to the Social Security Taxable Wage Base or \$117,020. (For an employer that is not enrolled in Social Security, the maximum amount is \$140,424 or 120% of the Social Security Taxable Wage Base). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2015. (reference: Section 7522.10(d))

APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates:

Healthy: For General Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set back one year.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set back two years.

Disabled: For General Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set forward six years for males and set forward seven years for females.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set forward three years.

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

Member Contribution Rates: For General Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set back one year, weighted 30% male and 70% female.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected to 2030 with Scale AA, set back two years, weighted 85% male and weighted 15% female.

Termination Rates Before Retirement:

Age	Rate (%) Mortality			
	General		Safety	
	Male	Female	Male	Female
25	0.03	0.01	0.02	0.01
30	0.04	0.02	0.03	0.02
35	0.06	0.03	0.05	0.03
40	0.08	0.04	0.08	0.04
45	0.10	0.07	0.09	0.06
50	0.12	0.09	0.11	0.08
55	0.17	0.18	0.16	0.15
60	0.37	0.38	0.33	0.34
65	0.74	0.74	0.66	0.66

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

Termination Rates Before Retirement (continued):

Rate (%)			
Disability			
Age	General Tier 1 and Tier 4 ⁽¹⁾	General Tier 3 and Tier 5 ⁽²⁾	Safety ⁽³⁾
20	0.01	0.01	0.02
25	0.02	0.02	0.22
30	0.04	0.03	0.42
35	0.08	0.05	0.56
40	0.16	0.08	0.66
45	0.32	0.13	0.94
50	0.52	0.17	2.54
55	0.66	0.21	4.10
60	0.70	0.27	4.80
65	0.70	0.36	5.00
70	0.70	0.44	5.00

⁽¹⁾ 70% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 30% are assumed to be ordinary disabilities.

⁽²⁾ 35% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 65% are assumed to be ordinary disabilities.

⁽³⁾ 100% of Safety disabilities are assumed to be duty disabilities.

Termination Rates Before Retirement (continued):

Years of Service	Rate (%)	
	Withdrawal*	
	General	Safety
Less than 1	13.50	11.50
1	9.00	6.50
2	9.00	5.00
3	6.00	4.00
4	4.50	3.50
5	4.00	3.00
6	3.75	2.75
7	3.50	2.50
8	3.25	2.25
9	3.00	2.00
10	2.75	1.90
11	2.50	1.80
12	2.40	1.70
13	2.30	1.60
14	2.20	1.50
15	2.10	1.40
16	2.00	1.30
17	2.00	1.20
18	2.00	1.10
19	2.00	1.00
20 or more	2.00	1.00

* The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit. No withdrawal is assumed after a member is first assumed to retire.

Retirement Rates :

Rates (%)				
Age	General Tier 1 (Enhanced)	General Tier 3 (Enhanced)	General Tier 1 (Non-enhanced)	PEPRA General Tiers 4 and 5
50	5.00	4.00	3.00	0.00
51	4.00	3.00	3.00	0.00
52	6.00	3.00	3.00	2.00
53	6.00	5.00	3.00	3.00
54	12.00	5.00	3.00	3.00
55	20.00	10.00	10.00	5.00
56	20.00	10.00	10.00	5.00
57	20.00	10.00	10.00	6.00
58	22.00	12.00	10.00	8.00
59	25.00	12.00	10.00	9.00
60	30.00	15.00	25.00	10.00
61	35.00	20.00	15.00	14.00
62	35.00	27.00	40.00	21.00
63	35.00	27.00	25.00	21.00
64	35.00	30.00	30.00	21.00
65	40.00	40.00	40.00	27.00
66	40.00	40.00	35.00	33.00
67	40.00	40.00	35.00	33.00
68	40.00	40.00	35.00	33.00
69	40.00	40.00	35.00	33.00
70	100.00	40.00	100.00	50.00
71	100.00	40.00	100.00	50.00
72	100.00	40.00	100.00	50.00
73	100.00	40.00	100.00	50.00
74	100.00	40.00	100.00	50.00
75	100.00	100.00	100.00	100.00

Retirement Rates :

Rates (%)				
Age	Safety Tier A (Enhanced)	Safety Tier C (Enhanced)	Safety Tier A (Non-enhanced)	PEPRA Safety Tiers D and E
45	2.00	1.00	0.00	0.00
46	2.00	1.00	0.00	0.00
47	7.00	3.00	0.00	0.00
48	7.00	3.00	0.00	0.00
49	20.00	10.00	0.00	0.00
50	25.00	15.00	5.00	5.00
51	25.00	15.00	4.00	4.00
52	25.00	15.00	4.00	4.00
53	25.00	15.00	5.00	5.00
54	25.00	15.00	5.00	5.00
55	30.00	20.00	6.00	6.00
56	25.00	15.00	8.00	8.00
57	25.00	15.00	12.00	12.00
58	35.00	25.00	18.00	18.00
59	35.00	25.00	20.00	20.00
60	40.00	35.00	20.00	20.00
61	40.00	35.00	20.00	20.00
62	40.00	35.00	20.00	20.00
63	40.00	35.00	20.00	20.00
64	40.00	35.00	100.00	100.00
65	100.00	100.00	100.00	100.00

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

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

General Age: Age 59
Safety Age: Age 54

We assume that 40% and 60% of future General and Safety deferred vested members, respectively, will continue to work for a reciprocal employer. For reciprocals, we assume 5.25% compensation increases per annum.

Future Benefit Accruals: 1.0 year of service per year for the full-time employees. Continuation of current partial service accrual for part-time employees.

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 pre-retirement death or retirement. There is no explicit assumption for children's benefits.

Age of Spouse: Females are 3 years younger than their spouses.

Offsets by Other Plans of the Employer for Disability Benefits: The Plan requires members who retire because of disability from General Tier 3 and PEPRA General Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.

Leave Cashout Assumptions: The following assumptions for leave cashouts as a percentage of final average pay are used:

*General Tiers 1, 2 and 3
Safety Tiers A and C*

	Membership Date before January 1, 2013
Cost Group 1:	1.50%
Cost Group 2:	0.50% for Tier 2 0.75% for Tier 3
Cost Group 3:	6.50%
Cost Group 4:	0.25%
Cost Group 5:	1.50%
Cost Group 6:	1.25%
Cost Group 7:	0.75%
Cost Group 8:	0.75%
Cost Group 9:	0.00%
Cost Group 10:	1.50%
Cost Group 11:	3.00%
Cost Group 12:	3.50%

The cost of this pay element is recognized in the valuation as an employer and member cost in both basic and COLA components.

*PEPRA General Tiers 4 and 5
PEPRA Safety Tiers D and E*

None

Service From Accumulated

Sick Leave Conversion:

The following assumptions for additional service converted due to accumulated sick leave as a percentage of service at retirement are used:

Service Retirements:

General: 1.25%
Safety: 2.00%

Disability Retirements:

General: 0.10%
Safety: 1.25%

Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.

Net Investment Return:

7.25%, net of administration and investment expenses

**Employee Contribution
Crediting Rate:**

7.25%, compounded semi-annually

Consumer Price Index:

Increase of 3.25% per year; retiree COLA increases due to CPI subject to a 3.00% maximum change per year except for Tier 3 and PEPRA Tier 5 disability benefits and Tier 2 benefits which are subject to a 4.00% maximum change per year (valued as a 3.25% increase). Safety Tier C benefits and benefits for PEPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding are subject to a 2.00% maximum change per year.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.25% per year, plus “across the board” salary increases of 0.75% per year, plus the following merit and promotional increases:

Years of Service	General	Safety
Less than 1	9.50%	10.00%
1	6.50	6.50
2	4.75	5.25
3	3.25	4.00
4	2.25	2.25
5	1.50	1.00
6	1.25	0.75
7	1.00	0.75
8	0.75	0.75
9	0.75	0.75
10	0.75	0.75
11	0.75	0.75
12	0.75	0.75
13	0.75	0.75
14	0.75	0.75
15	0.75	0.75
16	0.75	0.75
17	0.75	0.75
18	0.75	0.75
19	0.75	0.75
20 or more	0.75	0.75

APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates:

Healthy:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2015 projection scale.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected generationally with the two-dimensional MP-2015 projection scale.

Disabled:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional MP-2015 projection scale.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years, projected generationally with the two-dimensional MP-2015 projection scale.

Beneficiaries:

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

Member Contribution Rates:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

Pre-Retirement Mortality Rates:

Headcount-Weighted RP-2014 Employee Mortality Table times 75%, projected generationally with the two-dimensional MP-2015 projection scale.

Termination Rates Before Retirement:

Age	Rate (%)	
	Mortality	
	Male	Female
25	0.05	0.02
30	0.05	0.02
35	0.05	0.03
40	0.06	0.04
45	0.09	0.06
50	0.16	0.10
55	0.26	0.16
60	0.42	0.23
65	0.73	0.33

All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.

Age	Rate (%)		
	Disability		
	General Tier 1 and Tier 4⁽¹⁾	General Tier 3 and Tier 5⁽²⁾	Safety⁽³⁾
20	0.01	0.01	0.02
25	0.02	0.02	0.22
30	0.04	0.03	0.42
35	0.08	0.05	0.56
40	0.22	0.08	0.66
45	0.36	0.13	1.00
50	0.52	0.16	2.88
55	0.60	0.20	4.60
60	0.60	0.28	5.00
65	0.60	0.32	5.00
70	0.60	0.32	5.00

⁽¹⁾ 65% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 35% are assumed to be ordinary disabilities.

⁽²⁾ 30% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 70% are assumed to be ordinary disabilities.

⁽³⁾ 100% of Safety disabilities are assumed to be duty disabilities.

Termination Rates Before Retirement (continued):

Years of Service	Rate (%)	
	Withdrawal*	
	General	Safety
Less than 1	13.50	13.00
1	9.25	8.00
2	9.00	7.00
3	6.00	5.50
4	4.50	3.75
5	4.25	3.25
6	3.75	3.00
7	3.50	2.75
8	3.25	2.50
9	3.00	2.25
10	2.75	2.00
11	2.50	1.90
12	2.40	1.80
13	2.30	1.70
14	2.20	1.60
15	2.10	1.50
16	2.00	1.40
17	2.00	1.30
18	2.00	1.20
19	1.75	1.10
20 or more	1.50	1.00

* The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit. No withdrawal is assumed after a member is first assumed to retire.

Retirement Rates :

Rates (%)				
Age	General Tier 1 (Enhanced)	General Tier 3 (Enhanced)	General Tier 1 (Non-enhanced)	PEPRA General Tiers 4 and 5
50	5.00	4.00	3.00	0.00
51	4.00	3.00	3.00	0.00
52	5.00	3.00	3.00	2.00
53	5.00	5.00	3.00	3.00
54	14.00	6.00	3.00	3.00
55	20.00	10.00	10.00	5.00
56	20.00	10.00	10.00	5.00
57	20.00	10.00	10.00	6.00
58	20.00	12.00	10.00	8.00
59	25.00	13.00	10.00	9.00
60	28.00	15.00	25.00	10.00
61	35.00	20.00	15.00	14.00
62	35.00	25.00	40.00	20.00
63	30.00	25.00	35.00	20.00
64	30.00	30.00	30.00	20.00
65	35.00	35.00	40.00	25.00
66	40.00	35.00	35.00	30.00
67	40.00	35.00	35.00	30.00
68	40.00	35.00	35.00	30.00
69	40.00	35.00	35.00	30.00
70	50.00	40.00	50.00	50.00
71	50.00	40.00	50.00	50.00
72	50.00	40.00	50.00	50.00
73	50.00	40.00	50.00	50.00
74	50.00	40.00	50.00	50.00
75	100.00	100.00	100.00	100.00

Retirement Rates :

Rates (%)				
Age	Safety Tier A (Enhanced)	Safety Tier C (Enhanced)	Safety Tier A (Non-enhanced)	PEPRA Safety Tiers D and E
45	4.00	2.00	0.00	0.00
46	3.00	1.00	0.00	0.00
47	10.00	4.00	0.00	0.00
48	10.00	4.00	0.00	0.00
49	25.00	12.00	0.00	0.00
50	30.00	18.00	5.00	5.00
51	30.00	18.00	4.00	4.00
52	25.00	15.00	4.00	4.00
53	25.00	15.00	5.00	5.00
54	25.00	15.00	8.00	6.00
55	28.00	18.00	10.00	10.00
56	25.00	15.00	10.00	10.00
57	25.00	15.00	12.00	18.00
58	35.00	25.00	18.00	18.00
59	35.00	25.00	20.00	18.00
60	35.00	30.00	20.00	18.00
61	35.00	30.00	20.00	20.00
62	35.00	30.00	20.00	20.00
63	35.00	30.00	20.00	20.00
64	50.00	40.00	100.00	30.00
65	100.00	100.00	100.00	30.00
66	100.00	100.00	100.00	100.00

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

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

General Age: Age 59
Safety Age: Age 54

We assume that 40% and 65% of future General and Safety deferred vested members, respectively, will continue to work for a reciprocal employer. For reciprocals, we assume 4.75% compensation increases per annum.

Future Benefit Accruals: 1.0 year of service per year for the full-time employees. Continuation of current partial service accrual for part-time employees.

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 pre-retirement death or retirement. There is no explicit assumption for children's benefits.

Age of Spouse: Male retirees are 3 years older than their spouses, and Female retirees are 2 years younger than their spouses.

Offsets by Other Plans of the Employer for Disability Benefits: The Plan requires members who retire because of disability from General Tier 3 and PEPRA General Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.

Leave Cashout Assumptions: The following assumptions for leave cashouts as a percentage of final average pay are used:

*General Tiers 1, 2 and 3
Safety Tiers A and C*

	Membership Date before January 1, 2013
Cost Group 1:	1.25%
Cost Group 2:	0.50% for Tier 2 1.00% for Tier 3
Cost Group 3:	5.50%
Cost Group 4:	0.50%
Cost Group 5:	1.00%
Cost Group 6:	0.75%
Cost Group 7:	1.00%
Cost Group 8:	0.75%
Cost Group 9:	0.00%
Cost Group 10:	1.00%
Cost Group 11:	2.50%
Cost Group 12:	2.50%

The cost of this pay element is recognized in the valuation as an employer and member cost in both basic and COLA components.

*PEPRA General Tiers 4 and 5
PEPRA Safety Tiers D and E*

None

Service From Accumulated Sick Leave Conversion:

The following assumptions for service converted from accumulated sick leave as a percentage of service at retirement are used:

Service Retirements:

General:	1.20%
Safety:	1.90%

Disability Retirements:

General:	0.08%
Safety:	1.30%

Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.

Net Investment Return:

7.00%, net of administration and investment expenses

Employee Contribution Crediting Rate:

7.00%, compounded semi-annually

Consumer Price Index:

Increase of 2.75% per year; retiree COLA increases due to CPI subject to a 3.00% maximum change per year (valued as a 2.75% increase) except for Tier 3 and PEPRA Tier 5 disability benefits and Tier 2 benefits which are subject to a 4.00% maximum change per year (valued as a 2.75% increase). Safety Tier C benefits, Safety Tier E benefits and benefits for PEPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding are subject to a 2.00% maximum change per year. For members that have COLA banks, they are reflected in projected future COLA's.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 2.75% 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%	10.50%
1	7.25	7.25
2	5.25	5.75
3	3.75	4.50
4	2.75	3.00
5	2.25	1.75
6	1.75	1.25
7	1.50	1.20
8	1.25	1.15
9	1.20	1.10
10	1.15	1.05
11	1.10	1.00
12	1.00	0.95
13	0.90	0.85
14	0.80	0.80
15	0.75	0.75
16	0.75	0.75
17	0.75	0.75
18	0.75	0.75
19	0.75	0.75
20 or more	0.75	0.75
