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September 17, 2012

Ms. Jeanne Kopek, Assistant Director
State of Connecticut
Office of the State Comptroller
Retirement Services Division
55 Elm Street
Hartford, CT 06106

Dear Ms. Kopek:

Enclosed is the "Connecticut Probate Judges and Employees Retirement System Experience Investigation for the Four-Year Period Ending December 31, 2011". The investigation includes the economic and demographic experience for the Connecticut Probate Judges and Employees Retirement System (PJERS).

Please let us know if there are any questions concerning this report.

Sincerely,

Thomas J. Cavanaugh, FSA, FCA, MAAA, EA
Chief Executive Officer

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

Edward J. Koebel, FCA, MAAA, EA
Principal and Consulting Actuary

TJC/kc

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Cavanaugh Macdonald
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The experience and dedication you deserve

CONNECTICUT PROBATE JUDGES
AND EMPLOYEES RETIREMENT SYSTEM

EXPERIENCE INVESTIGATION FOR THE
FOUR-YEAR PERIOD ENDING DECEMBER 31, 2011

www.CavMacConsulting.com

September 17, 2012

State of Connecticut
State Employees Retirement Commission
55 Elm Street
Hartford, CT 06106

Members of the Commission:

We are pleased to submit the results of an investigation of the economic and demographic experience for the Connecticut Probate Judges and Employees Retirement System (PJERS). The purpose of the investigation was to assess the reasonability of the actuarial assumptions currently used by the Retirement System. This investigation covers the four-year period from January 1, 2008 to December 31, 2011.

The investigation of the experience of members of the System includes all active and retired members as well as beneficiaries of deceased members. In some instances, the experience was investigated separately for males and females since different tables are used for each of these groups.

The results of the investigation indicate that the assumed rates of separation from active service due to withdrawal, service retirement and post-retirement mortality do not accurately reflect the actual and anticipated experience of the Retirement System. As a result of the investigation, new withdrawal, service retirement and mortality tables have been developed which reflect more closely the actual experience of the membership.

This report shows a comparison of the actual and expected cases of separation from active service, actual and expected number of deaths, and actual and expected salary increases. A comparison between the rates of separation and mortality presently in use and the recommended revised rates are also shown in this report.

Members of the Commission
September 17, 2012

All new assumptions are shown in the attached tables in Appendix D of this report. In the actuary's judgment, the recommended assumptions are suitable for use until further experience indicates that modifications are desirable.

The experience investigation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Thomas J. Cavanaugh

Thomas J. Cavanaugh, FSA, FCA, MAAA, EA
Chief Executive Officer

John Garrett

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

Edward J. Koebel

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Section I
Executive Summary

The following table summarizes the findings and recommendations with regard to the assumptions utilized for the Connecticut Probate Judges and Employees Retirement System. Detailed explanations for the recommendations are found in the sections that follow.

Economic Assumption Changes

The table below lists the three economic assumptions used in the actuarial valuations and their current and proposed rates. We present two recommendations which vary by the rate of price inflation assumed. We find either recommendation to be reasonable for the Committee's consideration.

Item	Current	Recommendation #1	Recommendation #2
Price Inflation	3.00%	3.00%	2.75%
Investment Return	8.25%	8.25%	8.00%
Wage Inflation	4.00%	4.00%	3.75%

Recommended Demographic Assumption Changes

The table below lists the demographic assumptions that should be changed based on the experience of the last four years.

Assumption	Changes
Withdrawal	Recommend change to current assumption
Disability Retirement	No changes
Service Retirement	Recommend change to current assumption
Mortality	Recommend change to current assumption
Salary Scale	Recommend change to current assumption (Under Recommendation #2 Only)

Financial Impact

The following table highlights the impact of the recommended changes on the principal valuation results.

Impact on Principal Valuation Results			
	Valuation Results 2011	**Recommended Assumptions #1**	**Recommended Assumptions #2**
Unfunded Accrued Liability	$(12,026,962)	$(9,309,850)	$(8,946,362)
Funding Ratio	116.4%	112.3%	111.7%
Employer Annual Required Contribution			
Normal	11.33%	11.29%	11.36%
Accrued Liability	(8.04)%	(6.22)%	(5.90)%
Total	3.29%	5.07%	5.46%
Amortization Period (in years)	17	17	17

Section II
Economic Assumptions

There are three economic assumptions used in the actuarial valuations performed for the Connecticut Retirement Systems. They are:

- Price Inflation
- Investment Return
- Wage Inflation

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Economic Assumptions for Measuring Pension Obligations"*, which provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans. As noted in ASOP No. 27, because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes based on a mixture of past experience and future expectations. These estimates therefore are best stated as a range utilizing the actuary's professional judgment. In setting the range and the single point within that range to use, the actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table shows our recommendations followed by detailed discussions of each assumption.

Item	Current	Recommendation #1	Recommendation #2
Price Inflation	3.00%	3.00%	2.75%
Real Rate of Return	5.25	5.25	5.25
Investment Return	8.25%	8.25%	8.00%
Price Inflation	3.00%	3.00%	2.75%
Real Wage Growth	1.00	1.00	1.00
Wage Inflation	4.00%	4.00%	3.75%

Price Inflation

Background: As can be seen from the table on the previous page, assumed price inflation is used as the basis for both the investment return assumption and the wage inflation assumption. These latter two assumptions will be discussed in detail in the following sections.

It is important that the price inflation assumption be consistently applied throughout the economic assumptions utilized in an actuarial valuation. This is called for in ASOP No. 27 and is also required to meet the parameters for determining pension liabilities and expense under Governmental Accounting Standards Board (GASB) Statements No. 25 and 27.

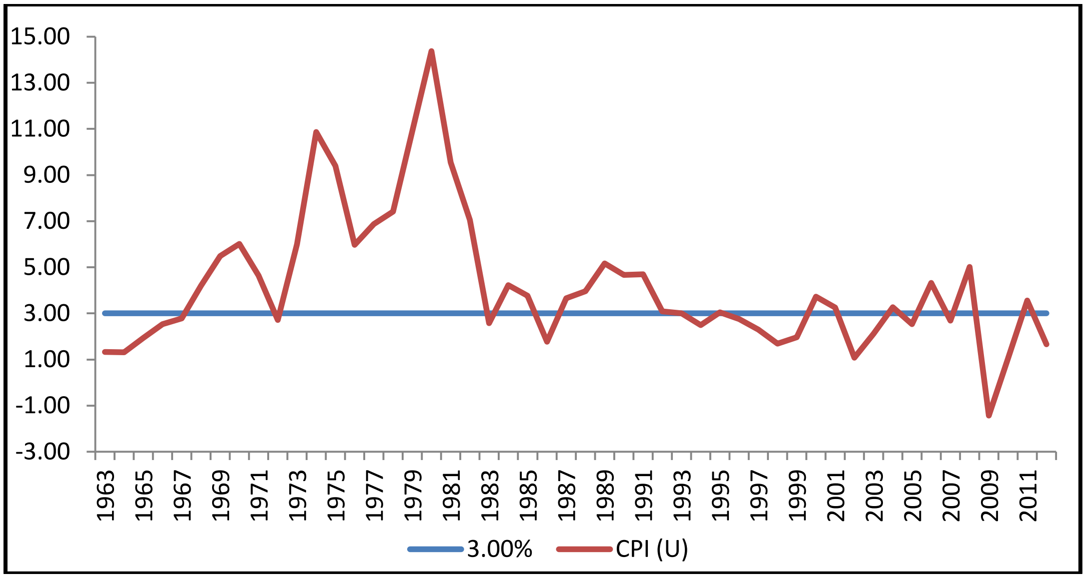
The current price inflation assumption is 3.00% per year.

Past Experience: The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The table below provides historical annualized rates and annual standard deviation of the CPI-U over periods ending June 30th.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 - 2012	86	3.00%	4.20%
1952 - 2012	60	3.66%	2.91%
1962- 2012	50	4.14%	2.92%
1972 - 2012	40	4.36%	3.14%
1982 - 2012	30	2.91%	1.39%
1992 - 2012	20	2.49%	1.37%
2002 - 2012	10	2.46%	1.82%

The following graph illustrates the historical levels of price inflation measured as of June 30th of each of the last 50 years and compared to the current 3.00% annual rate currently assumed.

Annual Rate of CPI (U) Increases



Over shorter historical periods, the average annual rate of increase in the CPI-U has been below 3.00%. The period of high inflation from 1973 to 1982 has a significant impact on the averages over periods which include these rates. Further, the average rate of 3.00% over the entire 86 year period is close to the average rate of 2.91% for the prior 30 years (1982 to 2012) but the volatility of the annual rates in the more recent years has been markedly lower as indicated by the significantly lower annual standard deviations. Many experts attribute the lower average annual rates and lower volatility to the increased efforts of the Federal Reserve since the early 1980's to stabilize price inflation. As the Fed's efforts to promote stability in price inflation are expected to continue, we give greater weight to the 30-year historical period in our analysis.

Additional information to consider in formulating this assumption is obtained from measuring the spread on Treasury Inflation Protected Securities (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities (bonds) and the inflation indexed yield on TIPS of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. The table below provides the calculation of the breakeven rate of inflation as of June 30, 2012.

Years to Maturity	Nominal Bond Yield	TIPS Yield	Breakeven Rate of Inflation
10	1.67%	-0.46%	2.13%
20	2.38%	0.15%	2.23%
30	**2.76%**	**0.56%**	**2.20%**

The bond market's expectation for the rate of inflation over the next 30 years is 2.20% which is lower than long term historical average rate. Additionally, based upon information contained in the "Survey of Professional Forecasters" for the second quarter of 2012 as published by the Philadelphia Federal Reserve Bank, the mean expected annual rate of inflation for the ten years beginning July 1, 2012 is 2.48%. Although 10 years of future expectation is too short of a period for the basis of our inflation assumption, the information does provide additional evidence that the consensus expectations of these experts are for significantly lower rates of inflation than the historical average for the near term future.

A most recent survey of large public plans, the *Public Fund Survey,* which is jointly sponsored by the National Association of State Retirement Administrators and the National Council on Teacher Retirement, shows that the median inflation assumption decreased from last year's results by 0.25% to 3.25% and the most common rate for this assumption among these plans is 3.00%. This reflects the updates through December of 2011 of the fiscal year 2010 survey results.

Recommendation: It is difficult to predict the annual rate of inflation. Current economic forecasts and the bond market suggest lower inflation over the next ten to thirty years which is a shorter time period than appropriate for our purposes. In the 2012 OASDI Trustees Report, the Chief Actuary for Social Security bases the 75 year cost projections on an intermediate inflation assumption of 2.8% with a range of 1.8% to 3.8%. We determine a reasonable range of 2.0% - 4.0% and note that the current rate of inflation assumption of 3.00% is at the mid-point of the range. We find that a reduction in the inflation assumption of 0.25% is an equally reasonable assumption which recognizes the lower than historical inflation outlook of both the bond market and professional forecasters.

Price Inflation Assumption	
Current	3.00%
Reasonable Range	2.00% - 4.00%
Recommendation #1	3.00%
Recommendation #2	2.75%

Assumed Cost-of-Living Adjustment (COLA)

The current Cost-of-Living Adjustment (COLA) assumption for PJERS is 2.50% for all participants.

The COLA is based upon the increase or decrease in CPI for the most recent fiscal year. The COLA is limited to three percent (3%), and no COLA will be applied if there is no increase in CPI or the increase is less than one percent (1%). The current COLA assumption is derived using an assumed rate of inflation of 3.00%. If a decrease in the Price Inflation Assumption under Recommendation #2 is adopted, then we recommend a slight decrease in the COLA assumption for this Plan. Below are our recommendations.

COLA Assumption	
Current	2.50%
Recommendation #1	2.50%
Recommendation #2	2.30%

Investment Return

Background: The assumed investment return is one of the most significant assumptions in the annual actuarial valuation process as it is used to discount the expected benefit payments for all active, inactive and retired members of the divisions. Minor changes in this assumption can have a major impact on valuation results. The investment return assumption should reflect the asset allocation target for the funds set by the Board of Trustees.

The current assumption is 8.25%, consisting of a price inflation assumption of 3.00% and a real rate of return assumption of 5.25%. The return is net of expenses.

Past Experience: The assets for the System are valued using a widely accepted asset-smoothing methodology that fully recognizes the expected investment income and also recognizes 1/5th of each year's investment gain or loss (the difference between actual and expected investment income). The recent experience over the last eight years is shown in the table below.

Year Ending 12/31	Actuarial Value	Market Value
2004	8.11%	13.85%
2005	8.02%	7.83%
2006	8.93%	12.68%
2007	8.59%	7.18%
2008	-6.22%	-21.92%
2009	3.93%	17.86%
2010	4.02%	11.44%
2011	1.73%	0.44%
Average	4.52%	5.44%

Historical returns over such a short time period are not credible for the purpose of setting the long-term assumed future rate of return. In determining the reasonable range for this assumption we first look at long-term historical returns of broad market indices. We focus on the returns of stocks and high-quality bonds because they are two major asset classes of typical allocations and have significant amounts of associated historical data.

Historical Analysis: Utilizing the historical real rates of return of the S&P 500 and the Intermediate Government Bond Index for the last 85 years and as contained in the latest data from Ibbotson, we determine the historical compound average annual rate of return of common asset allocations of large retirement funds (40% stocks/60% bonds to 70% stocks/30% bonds). On this basis the initial reasonable range for expected real rates of return is from 4.55% to 5.77%. We then add the historical inflation rate of 3.00% to the reasonable range of real returns. This yields an initial reasonable range for the long-term investment rate of return assumption of 7.55% to 8.77% based upon historical returns of the broad market indices under common allocations of stocks and bonds.

We next include in our analysis information concerning the future expectation for this assumption. In assessing the future expectation of investment returns, we prefer to analyze the capital market assumptions of the investment professionals assisting the State in determining its investment policies and asset allocations.

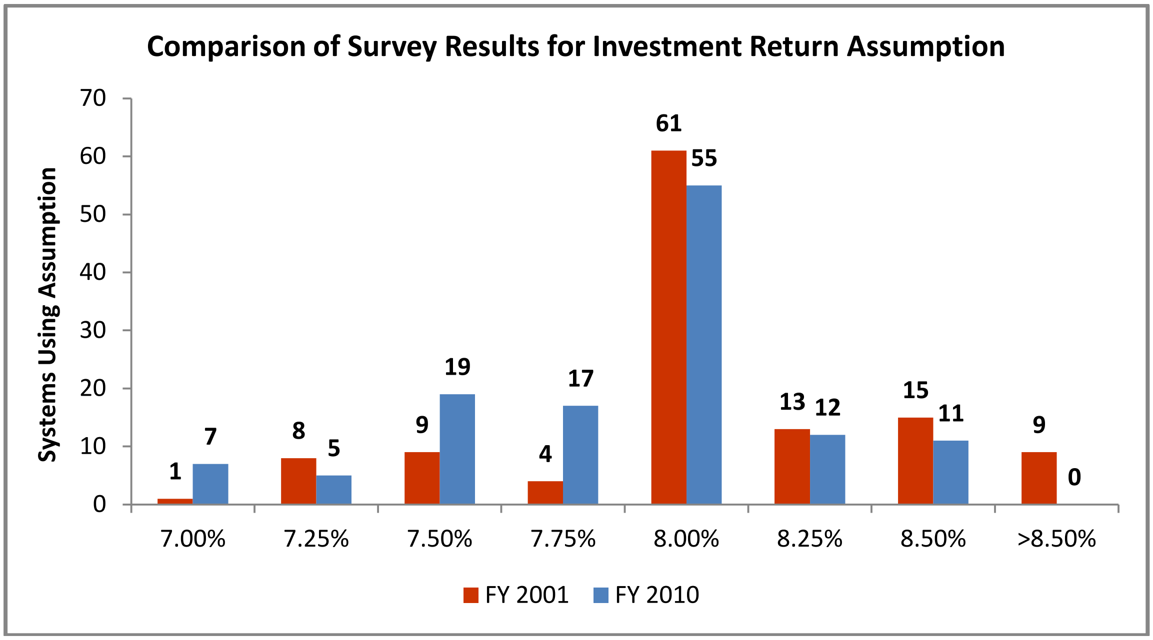
Future Expectation Analysis: The long-term capital market assumptions and current target asset allocation as provided to us by the State Treasurer's Office are shown in Appendix B. Using statistical methods, we determine that based on the assumptions for expected returns and volatility and using the target allocation among the asset classes, the median compound average rate of return is 7.92% and utilizes an assumed 2.10% annual rate of inflation (resulting in a median 5.82% real rate of return expectation).

The current Actuarial Standards of Practice prescribe that a reasonable range for this assumption would be between the 25th and 75th percentile of long-term expected returns. Our analysis, presented in the table below, produces a reasonable range for the long-term investment return assumption, net of investment related expenses, between 6.81% and 9.05% as shown in the table below:

Time Span In Years	Mean Return	Standard Deviation	Expected Returns by Percentile				
			5th	25th	50th	75th	95th
1	8.56%	11.81%	-9.72%	0.31%	7.92%	16.12%	29.01%
5	8.05	5.25	-0.36	4.45	7.92	11.51	16.89
10	7.99	3.71	2.00	5.45	7.92	10.45	14.19
20	7.95	2.62	3.70	6.17	7.92	9.70	12.32
30	7.94	2.14	4.46	6.49	7.92	9.37	11.50
50	7.93	1.66	5.23	**6.81**	7.92	**9.05**	10.68

Based on this analysis, there is 50% likelihood that the average net return will be 7.92% or more over a 50-year period. It can be inferred that the current 8.25% return assumption would have a slightly below 50% likelihood.

Review of the *Public Fund Survey* finds that as of the December 2011 update to the fiscal year 2010 results, 8.00% remains the median rate for this assumption. From the table above, an 8.00% average annual return over the 50 year period ranks at 52nd percentile. In other words, there is approximately a 48% likelihood that the long term average rate of return will be at least 8.00%. Further review of the latest survey results with historical results shows a clear shift in this assumption to lower assumed rates of return since the fiscal year 2001 survey as shown in the chart below:



Recommendation: The analysis of both the long-term historical and long-term future expectation produces consistent results. We are recommending a range for the investment return assumption based upon the equal weighting of the historical reasonable range of 7.6% to 8.8% with the 25th to 75th percentile of future expected returns over the 50 year time span from the table above (6.8% to 9.0%). This results in a reasonable range of 7.2% to 8.9%. The mid-point of this range is approximately 8.0%. The current assumption of 8.25% is well within the reasonable range but slightly higher than the midpoint. This assumption is composed of a 5.25% assumed real rate of return and a 3.00% assumed rate of inflation. Under the 2.75% assumed rate of inflation, the assumed rate of investment return is 8.00% utilizing the same 5.25% real return assumption. This second recommendation is provided for the Committee's consideration of an assumption which is slightly below the midpoint of the reasonable range. Our analysis is summarized on the following page.

It should be noted that while PJERS uses the same Capital Market Assumptions as the State Employees Retirement System (SERS), PJERS utilizes a slightly more conservative asset allocation and therefore, the midpoint of the range is closer to 8.00%, while the midpoint for SERS is closer to 8.25%. The Commission should discuss whether or not it should use different long-term investment assumptions for each of their Systems.

Investment Rate of Return Assumption	
Current	8.25%
Reasonable Range	7.2% - 8.9%
Recommendation #1	8.25%
Recommendation #2	8.00%

The table below provides the expected impact of all recommended assumptions on the 2011 actuarial valuation results.

Impact on Principal Valuation Results			
	Valuation Results 2011	**Recommended Assumptions #1 (8.25%)**	**Recommended Assumptions #2 (8.00%)**
Unfunded Accrued Liability	$(12,026,962)	$(9,309,850)	$(8,946,362)
Funding Ratio	116.4%	112.3%	111.7%
Employer Annual Required Contribution			
Normal	11.33%	11.29%	11.36%
Accrued Liability	(8.04)%	(6.22)%	(5.90)%
Total	3.29%	5.07%	5.46%
Amortization Period (in years)	17	17	17

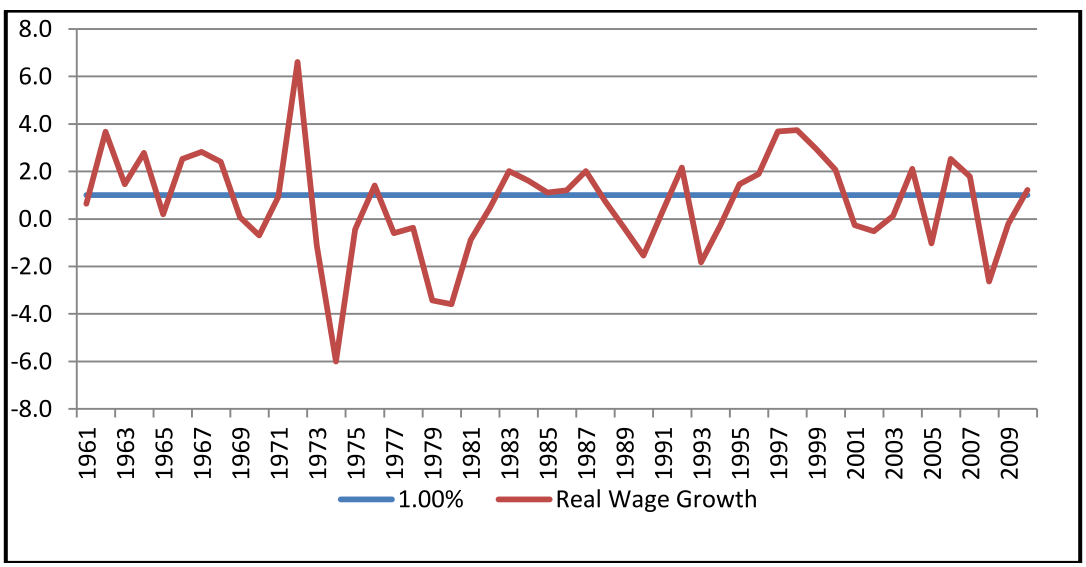
Wage Inflation

Background: The assumed future increases in salaries consist of an inflation component and a component for promotion and longevity, often called merit increases. The latter are generally age and or service related, and will be dealt with in the demographic assumption section of the report. Wage inflation normally is greater than price inflation as a reflection of the overall return on labor in the economy. The rate of wage inflation above inflation is called the real rate of wage inflation and is the focus of our analysis.

The current wage inflation assumption is 4.00%, and is composed of a 3.00% rate of inflation assumption and a 1.00% real rate of wage inflation.

Past Experience: The Social Security Administration publishes data on wage growth in the United States. Appendix C shows the last 50 calendar years' data. As with our analysis of inflation, we provide below wage inflation and a comparison with price inflation over various time periods. Currently this wage data is only available through calendar year 2010. We remove the rate of price inflation for each year from the data to result in the historical real rate of wage inflation. The graph below provides a comparison of the real wage inflation data as compared to the current 1.00% assumed rate.

Annual Real Rates of Wage Growth



The table below provides the historical data as average annual rates over various periods.

Period	Wage Inflation	Price Inflation	Real Wage Growth
2000-2010	2.63%	2.34%	0.29%
1990-2000	4.34	2.66	1.68
1980-1990	5.33	4.48	0.85
1970-1980	7.30	8.05	(0.75)
1960-1970	4.44	2.94	1.50
1990-2010	3.48	2.50	0.98
1980-2010	4.09	3.16	0.93
1970-2010	4.88	4.36	0.52
1960-2010	4.80	4.07	0.73

As the analysis of the national wage growth data shows, the shorter-term historical average real rate (0.29% for latest 10 year period) is significantly lower than the longer-term average real rates. The rate of real wage inflation over the prior 20 and 30 year periods is 0.98% and 0.93% respectively. Over the longer term, 50 years, the rate is 0.73% but this period is impacted by the high inflation experienced over the period between 1970 and 1980. Similarly to our discussion of the inflation assumption, we prefer to emphasize the analysis based on post-1980 data in anticipation of the continuation of the Federal Reserves' proactive stance on stabilizing inflation.

Over the study period (1/1/2008 to 12/31/2011), the experience data exhibits an average "across the board" rate of wage increase of 2.72%. The rate of inflation experienced over the same period is 1.81% and results a real rate of wage inflation of 0.91% for the study period.

Recommendation: As with price inflation, we again look at the 2012 OASDI Trustees Report. The Chief Actuary for Social Security bases the 75 year cost projections on an ultimate national wage growth assumption 1.12% greater than the price inflation assumption of 2.8%. We concur in general with a range of .5% to 1.5%, and recommend continued use of a 1.00% per year real rate which, when added to the recommended 3.00% and 2.75% price inflation rates, will result in the recommended rate of wage inflation assumption rate equal to 4.00% and 3.75%, respectively. Our findings are summarized in the table below.

Wage Inflation Assumption		
Current	4.00%	
	Reasonable Range	
Real Wage Growth	0.50%	1.50%
Proposed Inflation	2.75	3.00
Total	3.25%	4.50%
Recommendation #1	4.00%	
Recommendation #2	3.75%	

Section III
Demographic Assumptions

There are several demographic assumptions used in the actuarial valuations performed for the Connecticut Probate Judges and Employees Retirement System. They are:

- Rates of Withdrawal
- Rates of Disability Retirement
- Rates of Service Retirement
- Rate of Mortality
- Rates of Salary Merit Increase

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 35, *"Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations"*, which provides guidance to actuaries in selecting demographic assumptions for measuring obligations under defined benefit plans. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 35.

The purpose of a study of demographic experience is to compare what actually happened to the membership during the study period (January 1, 2008 through December 31, 2011) with what was expected to happen based on the assumptions used in the most recent Actuarial Valuations.

Detailed tabulations by age, service and/or gender are performed over the entire study period. These tabulations look at all active and retired members during the period as well as separately annotating those who experience a demographic event, also referred to as a decrement. In addition, the tabulation of all members together with the current assumptions permits the calculation of the number of expected decrements during the study period.

If the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, gender, or service does not follow the expected pattern, new assumptions are recommended. Recommended changes usually do not follow the exact actual experience during the observation period. Judgment is required to extrapolate future experience from past trends and current member behavior.

The remainder of this section presents the results of the demographic study. We have prepared tables that show a comparison of the actual and expected decrements and the overall ratio of actual to expected results (A/E Ratios) under the current assumptions. If a change is being proposed, the revised A/E Ratios are shown as well. Salary adjustments, other than the economic assumption for wage inflation discussed in the previous section, are treated as demographic assumptions.

RATES OF WITHDRAWAL

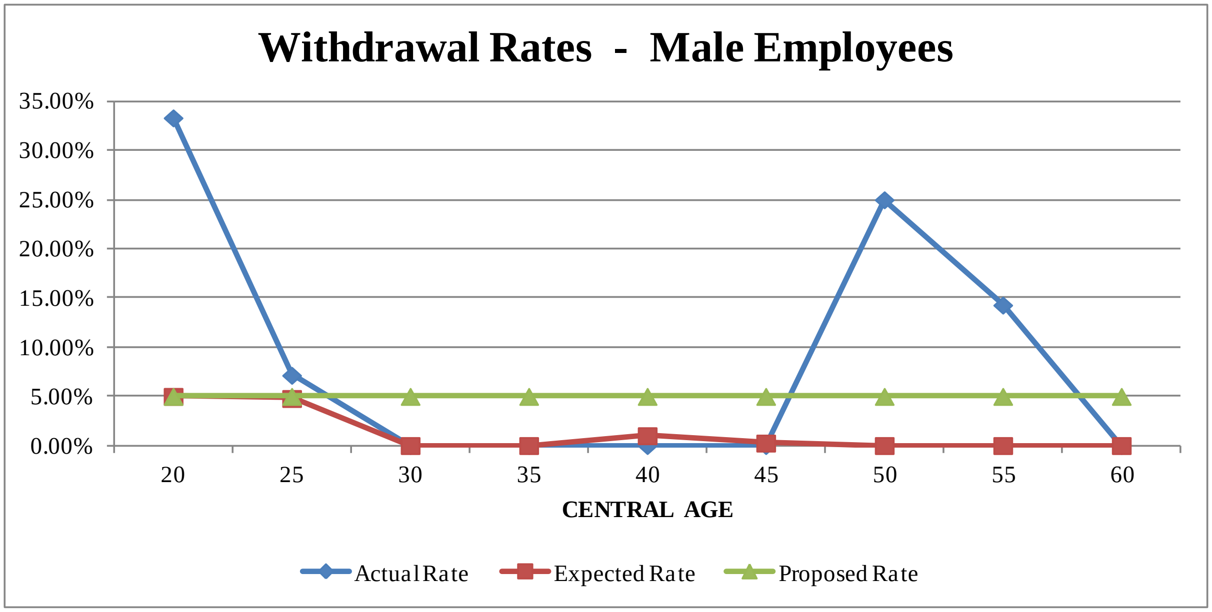
COMPARISON OF ACTUAL AND EXPECTED WITHDRAWALS FROM ACTIVE SERVICE

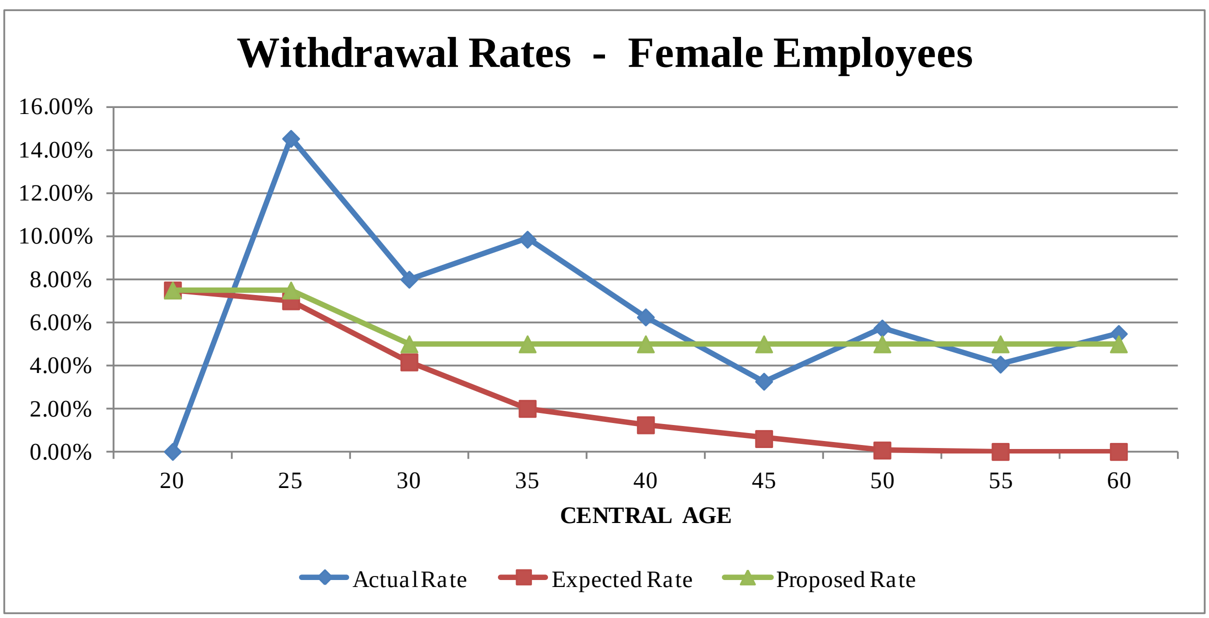
CENTRAL AGE OF GROUP	NUMBER OF WITHDRAWALS - JUDGES					
	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
40	0	0	0.000	1	0	0.000
45	1	0	0.000	3	0	0.000
50	6	0	0.000	0	0	0.000
55	2	0	0.000	2	0	0.000
60	3	0	0.000	1	0	0.000
63 & Over	5	0	0.000	0	0	0.000
TOTAL	**17**	**0**	**0.000**	**7**	**0**	**0.000**

CENTRAL AGE OF GROUP	NUMBER OF WITHDRAWALS - EMPLOYEES					
	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
20	1	0	0.000	0	1	0.000
25	1	1	1.000	8	4	2.000
30	0	0	0.000	4	2	2.000
35	0	0	0.000	7	1	7.000
40	0	0	0.000	5	1	5.000
45	0	0	0.000	3	1	3.000
50	1	0	0.000	9	0	0.000
55	1	0	0.000	3	0	0.000
60	0	0	0.000	4	0	0.000
63 & Over	0	0	0.000	2	0	0.000
TOTAL	**4**	**1**	**4.000**	**45**	**10**	**4.500**

The rates of withdrawal adopted by the Board are used to determine the expected number of separations from active service will occur as a result of resignation or dismissal. The experience indicates that during the period studied, there were significantly more withdrawals than expected for both Judges and Employees. Currently, the Judges do not have any assumptions for rates of withdrawals. However, of the 24 withdrawals in the Judges Plan, most of them were due in part to the Consolidation of Probate Courts that took place at the beginning of 2011. Therefore, we recommend no change in the withdrawal assumption for Judges. Since there were more withdrawals than expected for Employees (even with the consolidation of the Probate Courts in

2011), we recommend a change in these rates to match the experience of the group more closely. The following graph shows a comparison of the current expected, actual, and proposed rates of withdrawal for Employees.





Section III: Demographic Assumptions

The charts below provide our recommended changes to this assumption and the resulting A/E (actual to expected) ratio.

COMPARATIVE RATES OF WITHDRAWAL

AGE	RATES OF WITHDRAWAL – EMPLOYEES			
	MALES		FEMALES	
	Present	Proposed	Present	Proposed
20	5.0 %	5.0 %	7.5 %	7.5 %
25	5.0	5.0	7.5	7.5
30	2.5	5.0	3.8	5.0
35	1.3	5.0	1.9	5.0
40	0.8	5.0	1.3	5.0
45	0.4	5.0	0.6	5.0
50	0.0	5.0	0.0	5.0
55	0.0	5.0	0.0	5.0

COMPARISON OF ACTUAL AND EXPECTED WITHDRAWALS BASED ON PROPOSED RATES

CENTRAL AGE OF GROUP	NUMBER OF WITHDRAWALS - EMPLOYEES					
	MALES			FEMALES		
	Actual	Expected	Ratio of Actual to Expected	Actual	Expected	Ratio of Actual to Expected
20	1	0	0.000	0	1	0.000
25	1	1	1.000	8	4	2.000
30	0	0	0.000	4	3	1.333
35	0	0	0.000	7	4	1.750
40	0	0	0.000	5	4	1.250
45	0	0	0.000	3	5	0.600
50	1	0	0.000	9	8	1.125
55	1	1	1.000	3	4	0.750
60	0	0	0.000	4	4	1.000
63 & Over	0	0	0.000	2	2	1.000
TOTAL	**4**	**2**	**2.000**	**45**	**39**	**1.154**

RATES OF DISABILITY RETIREMENT

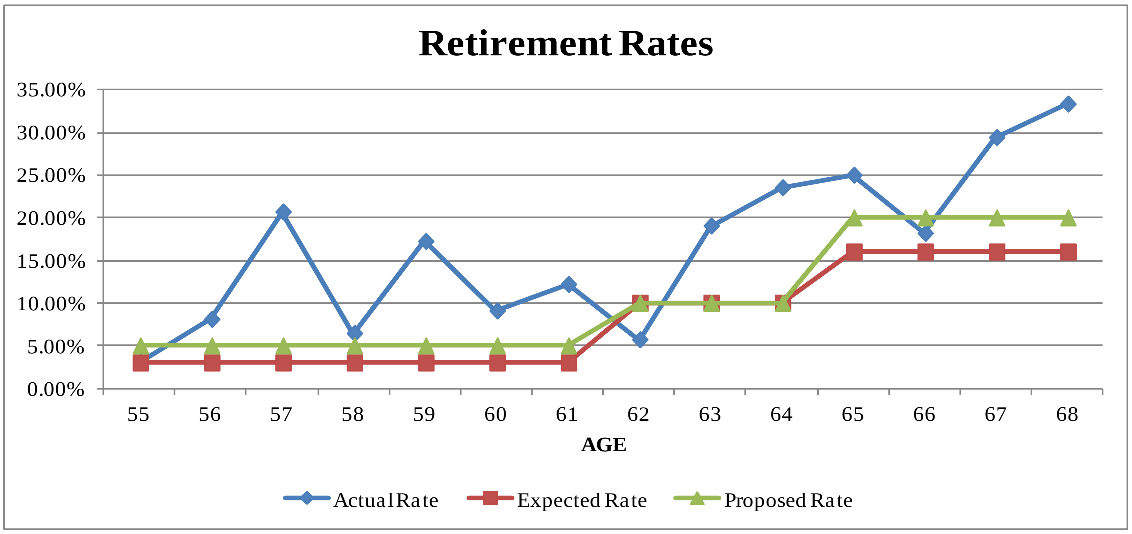
During the period under investigation, there were no disability retirements from the PJERS System. The rates of disability retirement are small enough that only 1 is expected to occur in a given year. We recommend no changes be made to the rates of disability retirement at this time.

RATES OF RETIREMENT

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS

AGE	NUMBER OF SERVICE RETIREMENTS		
	Actual	Expected	Ratio of Actual to Expected
Below 50	7	0	0.000
50	2	0	0.000
51	3	0	0.000
52	0	0	0.000
53	2	0	0.000
54	2	0	0.000
55	1	1	1.000
56	3	1	3.000
57	6	1	6.000
58	2	1	2.000
59	5	1	5.000
60	2	1	2.000
61	5	1	5.000
62	2	4	0.500
63	8	4	2.000
64	8	3	2.667
65	7	4	1.750
66	4	4	1.000
67	5	3	1.667
68	4	2	2.000
69	5	2	2.500
70	6	10	0.600
71	1	2	0.500
72	1	1	1.000
73 & Over	1	1	1.000
TOTAL	**92**	**47**	**1.957**

The analysis of the experience study shows that the actual number of retirements were significantly more than expected. This is in large part due to the consolidation of the Probate Courts in 2011, which saw many Probate Judges retire on January 4, 2011. However, even with the consolidation removed from consideration, we recommend a slight adjustment to the rates of retirement to reflect the experience of the other three years where actual retirements were slightly more than expected. The following graphs show a comparison of the present, actual, and proposed rates of service retirements.



Section III: Demographic Assumptions

The following tables show a comparison of the present and proposed rates of service retirement.

COMPARATIVE RATES OF RETIREMENT

AGE	RATES OF SERVICE RETIREMENT	
	Present	Proposed
Under 50	0.0 %	0.0 %
50	0.0	5.0
51	0.0	5.0
52	0.0	5.0
53	0.0	5.0
54	0.0	5.0
55	3.0	5.0
56	3.0	5.0
57	3.0	5.0
58	3.0	5.0
59	3.0	5.0
60	3.0	5.0
61	3.0	5.0
62	10.0	10.0
63	10.0	10.0
64	10.0	10.0
65	16.0	20.0
66	16.0	20.0
67	16.0	20.0
68	16.0	20.0
69	16.0	20.0
70	100.0	100.0

COMPARISON OF ACTUAL AND EXPECTED RETIREMENTS
BASED ON PROPOSED RATES OF RETIREMENT

AGE	NUMBER OF SERVICE RETIREMENTS		
	Actual	Expected	Ratio of Actual to
Below 50	7	0	0.000
50	2	1	2.000
51	3	1	3.000
52	0	1	0.000
53	2	1	2.000
54	2	1	2.000
55	1	2	0.500
56	3	2	1.500
57	6	1	6.000
58	2	2	1.000
59	5	1	5.000
60	2	1	2.000
61	5	2	2.500
62	2	4	0.500
63	8	4	2.000
64	8	3	2.667
65	7	6	1.167
66	4	4	1.000
67	5	3	1.667
68	4	2	2.000
69	5	2	2.500
70	6	10	0.600
71	1	2	0.500
72	1	1	1.000
73 & Over	1	1	1.000
TOTAL	**92**	**58**	**1.586**

RATES OF MORTALITY

Post-Retirement Mortality Rates

Since the Retirement System has minimal post-retirement mortality experience, we recommend that the rates of post-retirement mortality be revised to the same mortality tables used for the Connecticut State Employees' Retirement System (SERS). The recommended table for service retirements and beneficiaries of deceased members is the RP-2000 Combined Mortality Table projected with Scale AA for 15 years for males and for 25 years for females (also set back 2 years for males and set back 1 year for females). In addition, we recommend that the rates of disabled mortality also be changed to match the SERS mortality table which was changed to the 50% (males) and 80% (females) of the RP-2000 Disabled Mortality Table.

Pre-Retirement Mortality

Since the Retirement System has minimal pre-retirement mortality experience, we recommend that the rates of mortality in active service for both males and females be changed to the same mortality table that is used for post-retirement healthy mortality.

RATES OF SALARY INCREASE

COMPARISON OF ACTUAL AND EXPECTED RATES OF SALARY INCREASE OF ACTIVE MEMBERS

SERVICE OF GROUP	SALARIES AT END OF YEAR (1000's)		
	MALES AND FEMALES		
	Actual	Expected	Ratio of Actual to Expected
< 1	5,144	5,235	0.983
1	4,512	4,438	1.017
2	3,152	3,187	0.989
3	3,036	2,968	1.023
4	2,828	2,870	0.985
5	3,407	3,427	0.994
6	3,248	3,204	1.014
7	2,369	2,442	0.970
8	3,623	3,741	0.968
9	2,961	2,954	1.002
10+	29,535	30,190	0.978
TOTAL	**63,815**	**64,656**	**0.987**

The current annual assumed rate of salary increase is 5.0% regardless of the age or years of service of the member. Overall, the current assumed rate of salary increase was slightly greater than the actual rates of increase averaged over the study period. This result can be attributed mainly to the difference between actual and expected inflation over the review period. However, if the second recommendation of economic assumptions is adopted, we recommend that the long-term current salary increase assumption be lowered to 4.75%%.

OTHER ASSUMPTIONS AND METHODS

ASSETS: Currently the actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value. In addition, the actuarial value of assets is constrained to an 80% to 120% corridor around the market value of assets. This methodology is the most common asset smoothing method and we recommend no change at this time.

VALUATION COST METHOD: Currently, the valuation uses the Projected Unit Credit (PUC) Cost Method. While there is no issue with this method, the Commission may want to consider having a discussion about changing to the Entry Age Normal (EAN) Cost Method. The EAN cost method is the most widely used cost method of large public sector plans and has demonstrated the highest degree of contribution stability as compared to alternative methods. Actuarial gains and losses under EAN are reflected in the unfunded actuarial accrued liability. In addition, the EAN method is the only method allowed under the new GASB standards. Below is a table showing the proposed results using the current PUC Method versus the EAN Method at 8.25% and 8.00%.

Impact on Principal Valuation Results				
	Recommended Assumptions PUC (8.25%)	**Recommended Assumptions EAN (8.25%)**	**Recommended Assumptions PUC (8.00%)**	**Recommended Assumptions EAN (8.00%)**
Unfunded Accrued Liability	$(9,309,850)	$(5,204,700)	$(7,251,711)	$(3,129,786)
Funding Ratio	112.3%	106.5%	109.3%	103.8%
Employer Annual Required Contribution				
Normal	11.29%	9.92%	11.86%	10.54%
Accrued Liability	(6.22)%	(3.48)%	(4.78)%	(2.06)%
Total	5.07%	6.44%	7.08%	8.48%
Amortization Period (in years)	17	17	17	17

SPOUSES: Currently, for members who elect spouse coverage, husbands are assumed to be three years older than their wives. Since the data we currently have does not include spousal information, we will recommend no change to this assumption at this time, but will review closely during the next experience study.

Appendix A – CPI (U) Index

Historical June CPI (U) Index

Year	CPI (U)	Year	CPI (U)
1961	29.8	1987	113.5
1962	30.2	1988	118.0
1963	30.6	1989	124.1
1964	31.0	1990	129.9
1965	31.6	1991	136.0
1966	32.4	1992	140.2
1967	33.3	1993	144.4
1968	34.7	1994	148.0
1969	36.6	1995	152.5
1970	38.8	1996	156.7
1971	40.6	1997	160.3
1972	41.7	1998	163.0
1973	44.2	1999	166.2
1974	49.0	2000	172.4
1975	53.6	2001	178.0
1976	56.8	2002	179.9
1977	60.7	2003	183.7
1978	65.2	2004	189.7
1979	72.3	2005	194.5
1980	82.7	2006	202.9
1981	90.6	2007	208.352
1982	97.0	2008	218.815
1983	99.5	2009	215.693
1984	103.7	2010	217.965
1985	107.6	2011	225.722
1986	109.5	2012	229.478

Appendix B – Capital Market Assumptions and Asset Allocation

The tables below and on the following page are extracted from materials provided to us by the Treasurer's Office prepared by the investment consultant serving that office, Hewitt Ennis Knupp.

Real Rates of Return and Standard Deviations by Asset Class

Asset Class	Expected Real Rate of Return	Standard Deviation
Large Cap U.S. Equities	5.8%	19.5%
Developed Non-U.S. Equities	6.6%	21.0%
Emerging Market (Non-U.S.)	8.3%	30.5%
Real Estate	5.1%	15.5%
Private Equity	7.6%	27.5%
Alternative Investments	4.1%	8.5%
Fixed Income (Core)	1.3%	5.0%
High Yield Bonds	3.9%	14.5%
Emerging Market Bonds	3.7%	14.5%
TIPS	1.0%	4.5%
Cash	0.4%	2.0%

Asset Allocation Targets

Asset Class	Asset Allocation
Large Cap U.S. Equities	16%
Developed Non-U.S. Equities	15%
Emerging Market (Non-U.S.)	7%
Real Estate	7%
Private Equity	10%
Alternative Investments	5%
Fixed Income (Core)	9%
High Yield Bonds	15%
Emerging Market Bonds	8%
TIPS	5%
Cash	3%

Appendix B – Capital Market Assumptions and Asset Allocation

Asset Correlation Matrix

ASSET CLASS	Large Cap U.S. Equities	Developed Non-U.S. Equities	Emerging Market (Non-U.S.)	Cash	TIPS	Fixed Income (Core)	High Yield Bonds	Emerging Market Bonds	Alternative Investments	Real Estate	Private Equity	Inflation
Large Cap U.S. Equities	1.00											
Developed Non-U.S. Equities	0.78	1.00										
Emerging Market (Non-U.S.)	0.58	0.63	1.00									
Cash	0.11	0.09	0.04	1.00								
TIPS	0.00	0.01	-0.01	0.54	1.00							
Fixed Income (Core)	0.05	0.05	0.01	0.53	0.33	1.00						
High Yield Bonds	0.44	0.33	0.25	0.15	0.08	0.43	1.00					
Emerging Market Bonds	0.38	0.29	0.22	0.20	0.11	0.52	0.88	1.00				
Alternative Investments	0.52	0.51	0.36	0.37	0.17	0.22	0.31	0.29	1.00			
Real Estate	0.36	0.35	0.25	0.16	0.06	0.07	0.18	0.17	0.32	1.00		
Private Equity	0.60	0.47	0.36	0.09	0.01	0.05	0.33	0.29	0.39	0.28	1.00	
Inflation	0.09	0.11	0.07	0.61	0.55	0.11	0.06	0.06	0.23	0.11	0.08	1.00

Appendix C – Social Security Administration Wage Index

Social Security Administration Wage Index

Year	Wage Index	Annual Increase	Year	Wage Index	Annual Increase
1959	3,855.80	4.95%	1985	16,822.51	4.26%
1960	4,007.12	3.92	1986	17,321.82	2.97
1961	4,086.76	1.99	1987	18,426.51	6.38
1962	4,291.40	5.01	1988	19,334.04	4.93
1963	4,396.64	2.45	1989	20,099.55	3.96
1964	4,576.32	4.09	1990	21,027.98	4.62
1965	4,658.72	1.80	1991	21,811.60	3.73
1966	4,938.36	6.00	1992	22,935.42	5.15
1967	5,213.44	5.57	1993	23,132.67	0.86
1968	5,571.76	6.87	1994	23,753.53	2.68
1969	5,893.76	5.78	1995	24,705.66	4.01
1970	6,186.24	4.96	1996	25,913.90	4.89
1971	6,497.08	5.02	1997	27,426.00	5.84
1972	7,133.80	9.80	1998	28,861.44	5.23
1973	7,580.16	6.26	1999	30,469.84	5.57
1974	8,030.76	5.94	2000	32,154.82	5.53
1975	8,630.92	7.47	2001	32,921.92	2.39
1976	9,226.48	6.90	2002	33,252.09	1.00
1977	9,779.44	5.99	2003	34,064.95	2.44
1978	10,556.03	7.94	2004	35,648.55	4.65
1979	11,479.46	8.75	2005	36,952.94	3.66
1980	12,513.46	9.01	2006	38,651.41	4.60
1981	13,773.10	10.07	2007	40,405.48	4.54
1982	14,531.34	5.51	2008	41,334.97	2.30
1983	15,239.24	4.87	2009	40,711.61	(1.50)
1984	16,135.07	5.88	2010	41,673.83	2.36

Appendix D – Proposed Demographic Assumptions

TABLE 1
RATES OF SEPARATION FROM ACTIVE SERVICE

AGE	RATES OF WITHDRAWAL EMPLOYEES MALES	RATES OF WITHDRAWAL EMPLOYEES FEMALES	RATES OF SERVICE RETIREMENT	RATES OF DISABILITY	RATES OF DEATH MALES	RATES OF DEATH FEMALES
20	5.0 %	7.5 %		0.03 %	0.0237 %	0.0127 %
21	5.0	7.5		0.03	0.0252	0.0124
22	5.0	7.5		0.03	0.0267	0.0125
23	5.0	7.5		0.03	0.0285	0.0130
24	5.0	7.5		0.04	0.0301	0.0135
25	5.0	7.5		0.04	0.0321	0.0141
26	5.0	7.5		0.04	0.0344	0.0153
27	5.0	7.5		0.04	0.0349	0.0158
28	5.0	5.0		0.05	0.0351	0.0165
29	5.0	5.0		0.05	0.0354	0.0174
30	5.0	5.0		0.06	0.0365	0.0193
31	5.0	5.0		0.06	0.0382	0.0216
32	5.0	5.0		0.06	0.0412	0.0251
33	5.0	5.0		0.07	0.0463	0.0279
34	5.0	5.0		0.08	0.0521	0.0306
35	5.0	5.0		0.08	0.0585	0.0330
36	5.0	5.0		0.09	0.0651	0.0351
37	5.0	5.0		0.10	0.0717	0.0371
38	5.0	5.0		0.11	0.0768	0.0389
39	5.0	5.0		0.12	0.0814	0.0410
40	5.0	5.0		0.12	0.0855	0.0444
41	5.0	5.0		0.13	0.0892	0.0484
42	5.0	5.0		0.14	0.0928	0.0530
43	5.0	5.0		0.16	0.0967	0.0584
44	5.0	5.0		0.17	0.1014	0.0642
45	5.0	5.0		0.19	0.1067	0.0688
46	5.0	5.0		0.20	0.1131	0.0732
47	5.0	5.0		0.22	0.1202	0.0777
48	5.0	5.0		0.25	0.1269	0.0842
49	5.0	5.0		0.28	0.1341	0.0911
50	5.0	5.0	5.0 %	0.31	0.1416	0.1010
51	5.0	5.0	5.0	0.33	0.1496	0.1120
52	5.0	5.0	5.0	0.36	0.1579	0.1302
53	5.0	5.0	5.0	0.42	0.1809	0.1492
54	5.0	5.0	5.0	0.47	0.1970	0.1717
55	5.0	5.0	5.0	0.52	0.2187	0.1983
56	5.0	5.0	5.0	0.57	0.2434	0.2337
57	5.0	5.0	5.0	0.63	0.2802	0.2726
58	5.0	5.0	5.0	0.66	0.3297	0.3068
59	5.0	5.0	5.0	0.69	0.3684	0.3461
60	5.0	5.0	5.0	0.73	0.4140	0.3918
61	5.0	5.0	5.0	0.76	0.4739	0.4460
62	5.0	5.0	10.0	0.79	0.5378	0.5129
63	5.0	5.0	10.0	0.82	0.6213	0.5873
64	5.0	5.0	10.0	0.86	0.7088	0.6747
65	5.0	5.0	20.0	0.00	0.8104	0.7604
66	5.0	5.0	20.0		0.9270	0.8563
67	5.0	5.0	20.0		1.0467	0.9664
68	5.0	5.0	20.0		1.1662	1.0730
69	5.0	5.0	20.0		1.3011	1.1861
70	5.0	5.0	100.0		1.4246	1.3110

Appendix D – Proposed Demographic Assumptions

TABLE 2
RATES OF SALARY INCREASES

SERVICE	RATES OF SALARY INCREASE
Under 1	5.00 %
1	5.00
2	5.00
3	5.00
4	5.00
5	5.00
6	5.00
7	5.00
8	5.00
9	5.00
10 & Over	5.00

Above rates will be 4.75% if Recommendation #2 is adopted.

Appendix D – Proposed Demographic Assumptions

TABLE 3
RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF SERVICE AND BENEFICIARIES OF DECEASED MEMBERS

AGE	MALES	FEMALES	AGE	MALES	FEMALES
19	0.0226 %	0.0129 %	70	1.4246 %	1.3110 %
20	0.0237	0.0127	71	1.5785	1.4403
21	0.0252	0.0124	72	1.7702	1.5984
22	0.0267	0.0125	73	1.9586	1.7337
23	0.0285	0.0130	74	2.1747	1.9270
24	0.0301	0.0135	75	2.4595	2.0826
25	0.0321	0.0141	76	2.7438	2.2993
26	0.0344	0.0153	77	3.1091	2.5979
27	0.0349	0.0158	78	3.5184	2.8612
28	0.0351	0.0165	79	3.9735	3.1540
29	0.0354	0.0174	80	4.4829	3.4821
30	0.0365	0.0193	81	5.0581	3.8490
31	0.0382	0.0216	82	5.7062	4.2601
32	0.0412	0.0251	83	6.3864	4.7227
33	0.0463	0.0279	84	7.2437	5.2439
34	0.0521	0.0306	85	8.0745	5.9807
35	0.0585	0.0330	86	8.9800	6.8324
36	0.0651	0.0351	87	10.1197	7.8141
37	0.0717	0.0371	88	11.3903	8.7152
38	0.0768	0.0389	89	12.6189	9.9538
39	0.0814	0.0410	90	14.1803	11.0532
40	0.0855	0.0444	91	15.6710	12.2153
41	0.0892	0.0484	92	17.5326	13.4140
42	0.0928	0.0530	93	19.0966	14.9923
43	0.0967	0.0584	94	20.7060	16.2113
44	0.1014	0.0642	95	22.6749	17.3875
45	0.1067	0.0688	96	24.3277	18.5013
46	0.1131	0.0732	97	25.9578	20.0306
47	0.1202	0.0777	98	27.9676	20.9923
48	0.1269	0.0842	99	29.5386	21.8415
49	0.1341	0.0911	100	31.0600	22.5671
50	0.1416	0.1010	101	33.0207	23.7467
51	0.1496	0.1120	102	34.4556	24.4834
52	0.1579	0.1302	103	35.8628	25.4498
53	0.1809	0.1492	104	37.1685	26.6044
54	0.1970	0.1717	105	38.3040	27.9055
55	0.2187	0.1983	106	39.2003	29.3116
56	0.2434	0.2337	107	39.7886	30.7811
57	0.2802	0.2726	108	40.0000	32.2725
58	0.3297	0.3068	109	40.0000	33.7441
59	0.3684	0.3461	110	40.0000	35.1544
60	0.4140	0.3918	111	40.0000	36.4617
61	0.4739	0.4460	112	40.0000	37.6246
62	0.5378	0.5129	113	40.0000	38.6015
63	0.6213	0.5873	114	40.0000	39.3507
64	0.7088	0.6747	115	40.0000	39.8308
65	0.8104	0.7604	116	40.0000	40.0000
66	0.9270	0.8563	117	40.0000	40.0000
67	1.0467	0.9664	118	40.0000	40.0000
68	1.1662	1.0730	119	40.0000	40.0000
69	1.3011	1.1861	120	100.0000	100.0000

TABLE 4
RATES OF MORTALITY FOR MEMBERS RETIRED ON ACCOUNT OF DISABILITY

AGE	MALES	FEMALES	AGE	MALES	FEMALES
19	1.2414 %	0.5960 %	70	3.4421 %	3.0108 %
20	1.2414	0.5960	71	3.6213	3.2112
21	1.2414	0.5960	72	3.8173	3.4281
22	1.2414	0.5960	73	4.0311	3.6615
23	1.2414	0.5960	74	4.2632	3.9116
24	1.2414	0.5960	75	4.5137	4.1784
25	1.2414	0.5960	76	4.7823	4.4622
26	1.2414	0.5960	77	5.0682	4.7636
27	1.2414	0.5960	78	5.3702	5.0836
28	1.2414	0.5960	79	5.6866	5.4234
29	1.2414	0.5960	80	6.0155	5.7850
30	1.2414	0.5960	81	6.3549	6.1708
31	1.2414	0.5960	82	6.7032	6.5838
32	1.2414	0.5960	83	7.0589	7.0270
33	1.2414	0.5960	84	7.4208	7.5035
34	1.2414	0.5960	85	7.7882	8.0162
35	1.2414	0.5960	86	8.1606	8.5679
36	1.2414	0.5960	87	8.5379	9.1610
37	1.2414	0.5960	88	8.9202	9.7971
38	1.2414	0.5960	89	9.3078	10.4778
39	1.2414	0.5960	90	10.0874	11.2039
40	1.2414	0.5960	91	10.9873	11.9758
41	1.2414	0.5960	92	11.9133	12.7939
42	1.2414	0.5960	93	12.8514	13.6346
43	1.2414	0.5960	94	13.7881	14.6239
44	1.2414	0.5960	95	14.7120	15.5607
45	1.2414	0.5960	96	15.6148	16.4303
46	1.3116	0.6547	97	16.4919	17.2192
47	1.3818	0.7167	98	17.3413	17.9158
48	1.4522	0.7820	99	18.1614	18.5110
49	1.5228	0.8507	100	18.9506	18.9974
50	1.5936	0.9228	101	19.7245	19.5867
51	1.6647	0.9982	102	20.4427	20.3598
52	1.7360	1.0765	103	21.0672	21.2835
53	1.8072	1.1572	104	21.5602	22.3244
54	1.8784	1.2398	105	21.8837	23.4493
55	1.9493	1.3235	106	22.0000	24.6249
56	2.0203	1.4078	107	22.0000	25.8180
57	2.0914	1.4923	108	22.0000	26.9953
58	2.1634	1.5768	109	22.0000	28.1235
59	2.2367	1.6614	110	22.0000	29.1694
60	2.3123	1.7471	111	22.0000	30.0997
61	2.3911	1.8349	112	22.0000	30.8812
62	2.4740	1.9264	113	22.0000	31.4806
63	2.5621	2.0234	114	22.0000	31.8646
64	2.6569	2.1280	115	22.0000	32.0000
65	2.7596	2.2421	116	22.0000	32.0000
66	2.8717	2.3675	117	22.0000	32.0000
67	2.9948	2.5060	118	22.0000	32.0000
68	3.1300	2.6587	119	22.0000	32.0000
69	3.2787	2.8268	120	100.0000	100.0000