Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

CITY OF OMAHA EMPLOYEES RETIREMENT SYSTEM

Five Year Experience Study
For Period Ending December 31, 2011

Submitted: January, 2013

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August 13, 2013

Board of Trustees
City of Omaha Employees' Retirement System
1819 Farnam Street
Omaha , NE 68183

Dear Trustees:

It is a pleasure to submit this report of our investigation of the experience of the City of Omaha Employees' Retirement System (System) for the period of January 1, 2007 through December 31, 2011.

The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions to be used in the completion of the upcoming valuation. In some cases, we recommend changes from the prior assumptions that are designed to better anticipate the emerging experience of the Plan. Actual future experience, however, may differ from these assumptions.

In preparing this report, we relied without audit on information supplied by the City for the annual actuarial valuations. If any data or other information is inaccurate or incomplete, our analysis and recommendation may be impacted and a revised report may need to be issued.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

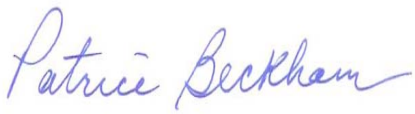
We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* and No. 35, *Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations*.

We look forward to our discussions and the opportunity to respond to your questions and comments.

I, Patrice A. Beckham, am a member of the American Academy of Actuaries, an Enrolled Actuary and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Brent A. Banister, am a member of the American Academy of Actuaries, an Enrolled Actuary and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal & Consulting Actuary

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Pension Actuary

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. Actuarial valuations of the City of Omaha Employees' Retirement System (COERS or the System) are prepared annually to determine the actuarial contribution rate to fund the System on an actuarial reserve basis, i.e. the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the System. The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, disability, termination of employment, retirement age and salary changes to estimate the obligations of the System.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have accurately anticipated actual emerging experience. This information, along with the professional judgment of the Board, its advisors, and the actuary, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to realize that actual experience is reported short term while assumptions are intended to be long term estimates of experience. Therefore, no single experience study period should be given full credibility in setting actuarial assumptions. If significant differences exist between what is expected from our assumptions and actual experience, our strategy is usually to recommend a change in assumptions that would produce results somewhere between the actual and expected experience.

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process. From one actuary to another, there should be very little difference in numerical results. However, the setting of assumptions is a different story, as it is more art than science. In this report, we have recommended a few changes to certain assumptions. To allow a better understanding of our thought process, we offer a brief summary of our philosophy:

- **Don't Overreact**: When we see significant differences in actual versus expected experience, we generally do not adjust our rates to reflect the entire difference. If the experience is credible and we believe it reflects future expectations, we will typically recommend rates somewhere between the old rates and the new experience. If the experience during the next study period shows the same result, we will probably recognize the trend at that point in time or at least move further in the direction of the observed experience. On the other hand, if actual experience in the next study is closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.

- **Anticipate Trends**: If there is an identified trend that is expected to continue, we believe that this should be recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.

- **Simplify**: In general, we attempt to identify which factors are significant and eliminate or ignore the ones that do not materially improve the accuracy of the liability projections.

At the request of the Board of Trustees, Cavanaugh Macdonald Consulting, LLC performed a study of the experience of the City of Omaha Employees Retirement System for the period January 1, 2007 through December 31, 2011. This report presents the results and recommendations of our study which, if approved, will be implemented in the January 1, 2014 actuarial valuation of the System.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

SCOPE OF THIS REPORT

The actuarial valuation utilizes various actuarial methods and two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its impact on the System. Demographic assumptions are based on the emergence of the specific experience of the Systems' members.

All of the major actuarial assumptions that will be used in the January 1, 2014 Actuarial Valuation have been reviewed in this Study. The remainder of this report is divided as follows:

SECTION 2 EXECUTIVE SUMMARY
SECTION 3 ACTUARIAL METHODS
SECTION 4 ECONOMIC ASSUMPTIONS
SECTION 5 DEMOGRAPHIC ASSUMPTIONS
SECTION 6 MORTALITY
SECTION 7 RETIREMENT
SECTION 8 DISABILITY
SECTION 9 TERMINATION OF EMPLOYMENT
SECTION 10 SALARY INCREASES

A brief summary of the results of our findings and recommendations is shown below:

Actuarial Methods

We are recommending that the current actuarial cost method and asset smoothing method be retained. However, we are recommending a new approach for the amortization of the unfunded actuarial liability (UAL) that is expected to provide more stability in the contribution rate. Currently, one amortization base, equal to the total UAL, is maintained and the UAL payment is determined over the remainder of the closed amortization period (20 years at January 1, 2012). We are recommending that the System move to a "layered" approach for the UAL where the existing UAL will continue to be amortized over the closed period but changes to the UAL in each future year will be set up as a new amortization base with payments determined as a level percentage of payroll over a closed 20 year period. The total UAL payment would be the sum of the amortization payments on all of the amortization bases.

Economic Assumptions

Preliminary projections for COERS indicate that, even if all actuarial assumptions are met, plan assets will be exhausted in about 20 years, absent changes in the contributions and/or benefit structure of the System,. This has serious implications for setting the investment return assumption since the appropriate timeframe is much shorter than normal and liquidity needs may be impacted if plan assets are continually shrinking. However, it is our understanding that the City and the member groups covered by the retirement system are working together to find a solution to the funding problem facing the System. This solution may involve increases in the contributions, changes to the benefit provisions or both. These changes should impact the net cash flow (contributions less benefit payments) for the System in a positive way, but the actual impact cannot be measured until the details of the solution are known. Given the funding outlook of the System, we are not comfortable making a specific assumption for the investment return assumption with such key issues unresolved at this time. The analysis we would normally include in the experience study, and which is appropriate for a long term perspective, is provided on the following pages. However, no recommendation for the investment return is made in this report.

The following set of economic assumptions is recommended:

- Investment Return: No recommendation at this time
- Inflation Assumption: 3.25% (Decrease from 3.5%)
- General Wage Increase: 4.0% (Same in total but inflation/productivity components changed)

Demographic Assumptions

As mentioned above, there may be changes to the current benefit structure for current active members as well as future hires to help address the System's funding concerns. If such changes occur for current members, it may impact the appropriateness of the assumption changes recommended in this report. We will need to reevaluate the entire set of assumptions used in the valuation process once all changes to the Retirement System have been finalized.

The study period (2007 through 2011) covered a timeframe that included several years during the severe economic downturn. This likely impacted the actual, observed experience for certain events such as retirement, termination of employment, and salary increases. Thus, we believe it is appropriate to be cautious in making any adjustments to the current assumptions based on the results of this study period alone. Having said that, we are recommending a few modest changes to some of the current demographic assumptions:

- Modify the retirement rates at first eligibility date and for those who retire after first eligibility to better reflect the different retirement experience observed during both the current and prior study periods.

- Modify the termination of employment assumption for years of service less than 16 to reflect the observed experience, with more credibility assigned to experience in 2007 and 2008.

- Modify the assumption regarding vested members leaving their contributions in the System to better reflect the actual experience and reasonable expectations in general.

Financial Impact

The estimated financial impact of the proposed change, based on results of the January 1, 2012 actuarial valuation, is summarized on the following page. The actual impact, which will be reflected in the January 1, 2014 actuarial valuation, may vary from the numbers shown on the exhibit on the following page.

Estimate of Financial Impact of Assumption Changes
Based on January 1, 2012 Valuation

	Baseline	Retirement Rate	Termination Rate	Refund by Vest Members
1. Present Value of Future Benefits	$476,554,290	$475,182,448	$474,639,806	$474,242,554
2. Present Value Future Normal Costs	55,743,931	56,977,882	57,053,536	56,738,657
3. Actuarial Accrued Liability (1) – (2)	420,810,359	418,204,566	417,586,270	417,503,897
4. Actuarial Value of Assets	236,741,347	236,741,347	236,741,347	236,741,347
5. Unfunded Actuarial Accrued Liability (UAAL) (3) – (4)	184,069,012	181,463,219	180,844,923	180,762,550
6. Normal Cost Rate	13.716%	13.553%	13.579%	13.511%
7. UAAL Payment	21.282%	20.980%	20.909%	20.899%
8. Actuarial Contribution Rate	34.998%	34.533%	34.488%	34.410%

Note: Actual impact of the assumption change on the January 1, 2014 valuation results may vary from that shown in this table which is based on the January 1, 2012 actuarial valuation.

ACTUARIAL COST METHOD

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed; i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries **will** influence the incidence of costs by their choice of methods and assumptions.

The valuation or determination of the present value of all future benefits to be paid by the System reflects the assumptions that best seem to describe anticipated future experience. The choice of a funding method does not impact the determination of the present value of future benefits. The funding method, determines only the incidence of cost. In other words, the purpose of the funding method is to allocate the present value of future benefits determination into annual costs. In order to perform this allocation, it is necessary for the funding method to "break down" the present value of future benefits into two components: (1) that which is attributable to the past (2) and that which is attributable to the future. The excess of that portion attributable to the past over the plan assets is then amortized over a period of years. Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial liability". The portion of the present value of future benefits allocated to the future is commonly known as "the present value of future normal costs", with the specific piece of it allocated to the current year being called "the normal cost". The difference between the plan assets and actuarial liability is called the "unfunded actuarial liability".

Two key points should be noted. First, there is no single "correct" funding method. Second, the allocation of the present value of future benefits and hence cost to the past for amortization and to the future for annual normal cost payments is not necessarily in a one-to-one relationship with service credits earned in the past and future service credits to be earned.

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. A brief summary of the main cost methods is included below.

- Entry-Age-Normal Cost Method

  The rationale of the entry age normal (EAN) funding method is that the cost of each member's benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit which is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The entry age normal actuarial liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial liability, the value of plan assets is subtracted from the entry age normal actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as predicted by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

- Projected Unit Credit

  The projected unit credit (PUC) funding method defines the actuarial liability to be the value of the employee's accrued benefit based upon his service as of the valuation date and his estimated final average earnings at the time he retires or otherwise exits. The normal cost is the present value of benefits accruing during the year with projected salary increases. The unfunded actuarial liability is determined by subtracting the actuarial value of assets from the actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

  As with the entry age normal funding method, the actuarial gains and losses that accrue each year modify the unfunded actuarial liability and the payment thereon.

- Aggregate

  This cost method does not develop individual normal costs, but calculates a normal cost rate for the entire plan. The total value of future normal costs is found by subtracting the actuarial value of assets from the present value of future benefits. This amount is then spread as a level percentage of future payroll for the entire group. Gain/losses are included in the present value of future benefits and thereby incorporated into the normal cost percentage for future years. The basic premise of the aggregate cost method is to develop a normal cost which, from the valuation date forward, will fund the whole unfunded portion of the plan's future benefits as a level percentage of payroll.

  This method does not differentiate between past service costs and current costs. Therefore, no actuarial liability exists under the aggregate cost method and actuarial gains and losses are not directly calculated as in the other cost methods.

- Frozen Entry Age

  The frozen entry age cost method is a blend of the entry age normal and aggregate cost methods. The unfunded actuarial liability is initially determined using the entry age normal funding method. Each year the unfunded actuarial liability (UAL) is set equal to the expected unfunded actuarial liability. Actuarial gains and losses are not reflected in the amount of the unfunded actuarial liability, but rather are reflected in the normal cost. The frozen actuarial liability is changed only to reflect plan amendments and changes in the actuarial assumptions. The amortization payments for the current and all future years are fixed at the time the unfunded actuarial liability is determined. The normal cost is developed similarly to that under the aggregate cost method. The present value of all future benefits is determined and then reduced by the valuation assets and the unfunded frozen actuarial liability. The resulting amount is then spread as a level percentage of future payroll.

COERS currently uses the Entry Age Normal cost method, which is popular with governmental plans because it develops a normal cost rate that tends to be stable and less volatile. It is used by about 85% of all public sector plans. **We recommend the Entry Age Normal actuarial cost method be retained.**

ACTUARIAL VALUE OF ASSETS

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value (called the actuarial value of assets) is often used to smooth out the volatility in the market value. This is because most plan sponsors would rather have annual costs remain relatively level, as a percentage of payroll or in actual dollars, rather than a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. GASB has certain requirements related to the calculations prepared under GASB Number 25. The American Academy of Actuaries (AAA) also has basic principles regarding the calculation of a smoothed value, *Actuarial Standard of Practice No. 44 (ASOP 44), Selection and Use of Asset Valuation Methods for Pension Valuations.*

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to distort annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

COERS values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. This philosophy is consistent with the long-term nature of a retirement system. Under this method, the actuarial value of the assets is the expected value of assets plus 25% of the difference between market value and expected value, where the expected value is last year's actuarial value and subsequent cash flows into and out of the fund accumulated with interest at the valuation rate (8%). This is mathematically equivalent to using a weighted average of 75% of the expected value and 25% of actual market value.

The current asset valuation method for COERS also includes what is known as a "corridor", which provides that once the initial determination of the actuarial value of assets is made it is compared to a corridor around market value (80% of market value to 120% of market value). If the initial actuarial value lies outside the corridor, the final actuarial value of assets is set equal to the corresponding corridor value. For example, if the initial calculation of the actuarial value of assets is 132% of market value, the actuarial value is set equal to 120% of market value. We believe the corridor is necessary to ensure actuarial standards are met.

An asset valuation method is used to "smooth out" the volatility that occurs in the market value of assets. We believe the current method, with the corridor adopted in 2007, is reasonable and meets actuarial standards. **We recommend the current asset valuation method, including the corridor, be retained.**

AMORTIZATION OF UAL

As described above, actuarial liabilities are the portion of the actuarial present value of future benefits that are not included in future normal costs. Thus it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded actuarial liabilities (UAL) exist when actuarial liabilities exceed plan assets. These deficiencies can result from (i) plan improvements that have not been completely paid for, (ii) experience that is less favorable than expected, (iii) assumption changes that increase liabilities or (iv) contributions that are less than the actuarial contribution rate. If the actuarial value of assets (AVA) exceeds the actuarial liability (AL), "surplus" exists.

There are a variety of different methods that can be used to amortize the UAL. Each method results in a different payment stream and, therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization amount increases, and
- The number of components of UAL with separate amortization bases.

The parameters in Governmental Accounting Standard Board Statement No. 25 (GASB 25) have evolved as a *de facto* funding standard for governmental plans. GASB 25 sets parameters for all of these characteristics. The maximum amortization period permitted is 30 years. The annual amortization amount can be either a level dollar amount or a level percentage of payroll. The UAL may be amortized as one amount or components may be amortized separately. A new GASB standard for Pension Reporting (GASB 67 and 68) will be effective in a few years which eliminates any linkage between the funding and accounting numbers. However, it is still useful to recognize the impact that the current GASB standards have had on funding policies in the recent past.

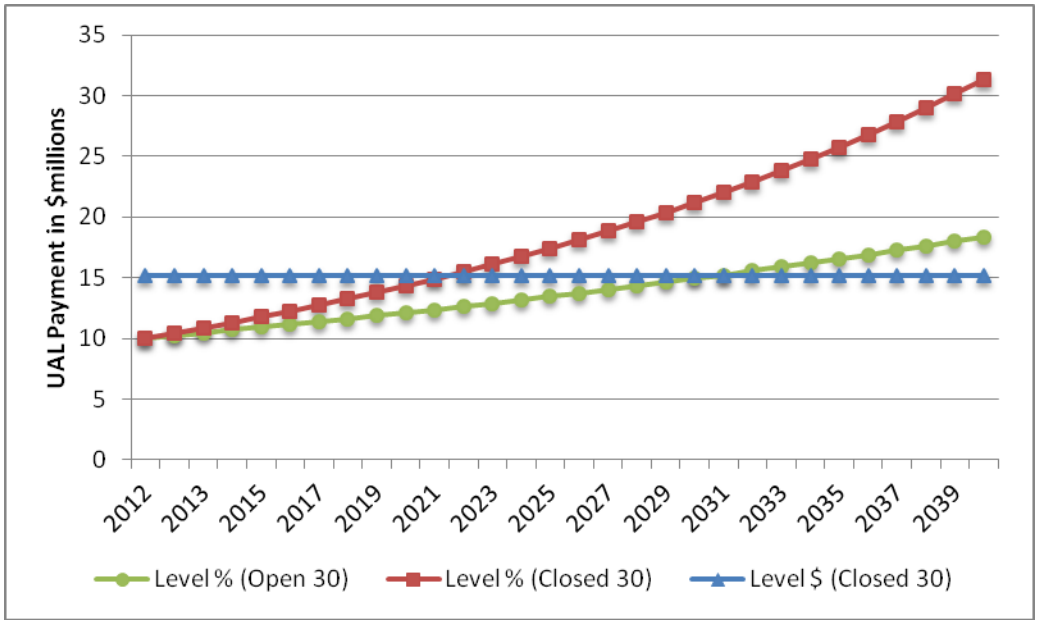
The amortization period can be either closed or open. If it is a closed amortization period, the number of year remaining in the amortization period declines each year. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but is reset to the same number each year. This approach essentially "refinances" the System's debt (UAL) every year, pushing off the payment of the UAL to future years. While the funded ratio may possibly increase over time under the open amortization period, the System is not expected to reach a funded ratio of 100%. The open amortization policy is especially of concern when the amortization period is very long (i.e. 25 or 30 years) due to the negative amortization that occurs (UAL payment is less than the interest on the UAL so the dollar amount of the UAL continually increases).

The level dollar amortization policy is similar to the method in which a home owner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on a predetermined number of years, until the liability is extinguished. This results in the liability steadily decreasing while the payments, though remaining level in dollar terms, in all probability decrease as a percentage of payroll. (Even if a plan sponsor's population is not growing or even slightly diminishing, inflationary increases will usually be sufficient to increase the aggregate covered payroll).

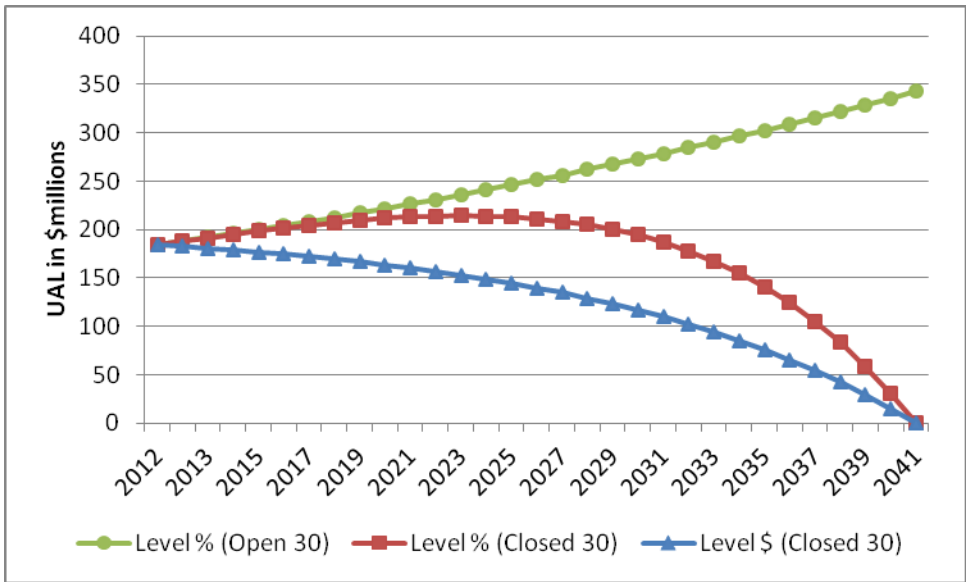
The rationale behind the level percentage of payroll amortization method is that since normal costs are calculated to be a constant percentage of pay, unfunded actuarial liabilities should be paid off in the same manner. When this method of amortizing the unfunded actuarial liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method,

but the payments increase at a fixed rate so that ultimately the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase as rapidly so that the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial liability meaning that even if there are no experience losses, the dollar amount of the unfunded actuarial liability will grow (called negative amortization). This is particularly true if the plan sponsor is paying off the unfunded actuarial liability over a long period, such as 30 years.

The following graph shows the dollar amount of amortization payment under the three different amortization methods, discussed earlier:



Use of the level percentage of payroll amortization has its advantages and disadvantages. From a budgetary standpoint, it makes sense to develop UAL contribution rates that are level as a percentage of payroll, since contributions to fund the Plan are made as a percent of payroll and normal cost is developed as a level percent of payroll. However, if payroll doesn't grow as expected, the UAL payment will increase as a percent of payroll rather than remain level. In addition, this approach clearly results in slower funding of the UAL, as illustrated in the following graph:



COERS currently develops the actuarial contribution rate using a closed 30 year period for amortizing the UAL. As of the January 1, 2012 valuation, 20 years remain in the amortization period. While this approach could be maintained (where the period declines by one each year and eventually reaches one), it will create volatility as the remaining years become shorter and shorter over time. More than likely the amortization period would be reset at some point in the future.

We believe that another approach to amortizing the UAL is worth further discussion and consideration. The proposed methodology would create a new amortization base each year equal to the change in the UAL for that year and that "piece" of the UAL would be amortized as a level percent of payroll over a closed 20 year period. The total UAL payment would be the sum of all of the individual amortization bases in place on the valuation date. By amortizing each based over a new 20 year period the payments are continually spreading the UAL payment over a period of years. The existing UAL would remain on the current amortization schedule with the closed amortization period and any changes to the UAL would be amortized over a new 20 year period. **We recommend this approach to the amortization of the UAL be adopted by the Board.**

We would note that, given the low salary increases being granted to public employees in the current economic environment, it should be expected that covered payroll will not increase as much as the assumed rate in the short term. Under these circumstances, the UAL contribution, as a percentage of payroll, is expected to increase rather than remain level. A lower payroll growth assumption for amortizing the UAL would introduce some conservatism into the amortization of the UAL. It would, however, result in a higher but more stable contribution rate. We would be happy to discuss this further with the Board if you desire.

ECONOMIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* provides guidance to actuaries giving advice on the selection of economic assumptions for measuring obligations under defined benefit plans, such as COERS. A new draft of ASOP 27 has been published, but has not yet been adopted so our discussion in this report reflects the current ASOP 27 standard.

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. These estimates are based on a mixture of past experience, future expectations, and professional judgment. 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.

Recognizing that there is not one "right answer", the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with all other economic assumptions over the measurement period.

An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experiences. The actuary may change assumptions frequently in certain situations, even if the best-estimate range has not changed materially, and less frequently in other situations. Even if assumptions are not changed, the actuary needs to be satisfied that each of the economic assumptions selected for a particular measurement complies with the Actuarial Standard of Practice No. 27.

The remaining section of this report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of COERS. In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table summarizes the economic assumptions:

	Current Assumptions	Recommended Assumptions
A. Consumer Price Inflation	3.50%	3.25%
B. Investment Return	8.00%	None at this timee
C. Payroll Growth	4.00%	4.00%

Based on our review and this study, we are recommending some changes to the economic assumptions. However, there is a range of reasonable assumptions. If the Board wishes to be more conservative, Cavanaugh Macdonald would not have a problem supporting such a set of economic assumptions.

CONSUMER PRICE INFLATION

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return and general wage growth.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates will result in lower expected investment returns, at least in the long run.

The long term inflation rate cannot be predicted with a significant degree of confidence. This uncertainty would present severe problems in funding a retirement plan were it not for the fact that the effects of inflation on investment return and salary level are, in part, offsetting at least for active members. Salaries increasing faster than expected produce unexpected liabilities. Investment returns which exceed the assumed rate result in unanticipated assets. Although not directly equal in amount, it is expected that these additional assets and liabilities will have some offset on one another over the long term.

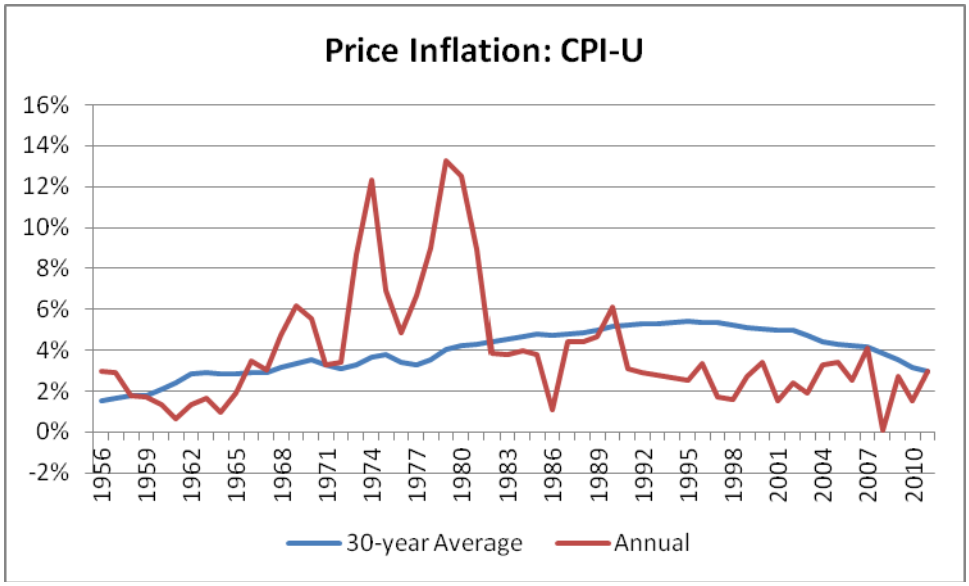
The current assumption for price inflation is 3.50% per year.

Past Experience: Although economic activities, in general, and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and long term trends are factors to be considered in developing the inflation assumption. 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 December 31st.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2011	85	2.99%	4.16%
1951 - 2011	60	3.63	2.94
1961 – 2011	50	4.12	2.95
1971 - 2011	40	4.35	3.15
1981 – 2011	30	2.96	1.22
1991 - 2011	20	2.49	0.90
2001 - 2011	10	2.48	1.12

The following graph illustrates the historical annual change in price inflation, measured as of December 31 of each for the last 55 years, as well as the thirty year rolling average.

Annual Rate of CPI (U) Increases



Over more recent periods, measured from December 31, 2011, the average annual rate of increase in the CPI-U has been 3.00% or lower. 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 3.07% over the entire 85 year period is close to the average rate of 2.97% for the prior 30 years (1981 to 2011) 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 (see earlier table). 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.

Forecasts of Inflation

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 December 31, 2011.

Years to Maturity	Nominal Bond Yield	TIPS Yield	Breakeven Rate of Inflation
10	1.89%	-0.07%	1.96%
20	2.57	0.53	2.04
30	2.89	0.78	2.11

Although many economists forecast lower inflation than the current assumption used by COERS, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the May 2012 report, the projected average annual increase in the CPI over the next 75 years was estimated to be 2.80%, under the intermediate cost assumptions. The lower cost assumption used a forecast of 1.80% and the high cost assumption was 3.8%, indicating a reasonable range for their projections of 1.8% to 3.8%.

The COERS investment consultant, DeMarche Associates also provided a long term assumption for inflation of 3.1% as part of their capital market assumptions.

Reasonable Range and Recommendation: Given the longer term perspective for pension funding, we believe that a range between 2.5% and 4.05% is reasonable for an actuarial valuation of a retirement system. Based on the information presented above, we believe it is reasonable to reduce the inflation assumption, but we prefer to make a small adjustment now and then evaluate whether another adjustment is appropriate in the next experience study. **Therefore, we recommend that the long-term price inflation assumption be lowered from 3.50% to 3.25%.**

Consumer Price Inflation	
Current Assumption	3.50%
Reasonable Range	2.50% - 4.00%
Recommended Assumption	3.25%

INVESTMENT RETURN

Use In The Valuation: The investment return assumption is one of the primary determinants in the allocation of the expected cost of the System's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. Generally, the investment return assumption should represent the long-term rate of return on the plan assets, considering the asset allocation policy, expected long term real rates of return on the specific asset classes, the underlying inflation rate, and investment expenses.

Preliminary projections for COERS indicate that plan assets will be exhausted in about 20 years, absent changes in the contributions and/or benefit structure of the System, even if all actuarial assumptions are met. This has serious implications for setting the investment return assumption since the appropriate timeframe is much shorter than normal and liquidity needs may be impacted if plan assets are continually shrinking. However, it is our understanding that the City and the member groups covered by the retirement system are working together to find a solution to the funding problem facing the System. This solution may involve increases in the contributions, changes to the benefit provisions or both. These changes should impact the net cash flow (contributions less benefit payments) for the System in a positive way, but the actual impact cannot be measured until the details of the solution are known. Given the funding outlook of the System, we are not comfortable making a specific assumption for the investment return assumption with such key issues unresolved at this time. The analysis we would normally include in the experience study, and which is appropriate for a long term perspective, is provided on the following pages. However, no recommendation for the investment return is made in this report.

The current assumption for investment return is 8.0% per year, net of all investment-related expenses (administrative expenses are paid directly by the City). The 8.0% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is price inflation (previously discussed). Any excess return over price inflation is referred to as the real rate of return. The real rate of return, based on the current set of assumptions, is 4.5% (8.0% nominal return and 3.5% inflation).

The Actuarial Standards Board Statement Number 27 provides guidance to actuaries on selecting economic assumptions. It lists specific factors that can be considered in constructing the best-estimate investment return range and/or selecting an investment return assumption within the range. Such factors are:

1. **The purpose of the measurement.** The measurement of obligations for an ongoing plan will differ from those of a terminating or frozen plan. An ongoing plan will typically reflect a longer time horizon and a more diversified investment portfolio.

   For a governmental plan, benefit security is tied to the funding agency's ability to provide the required funding. Since all governmental funding sources are ultimately some type of tax, the funding of the retirement system is dependent on the ability to increase or decrease allocated tax revenues to the system. Given the normal processes, it is much easier to lower the required funding allocations than to increase it, as it is easy enough to either lower the tax income or reallocate it to another need. A primary funding goal of most governmental plans is a stable contribution rate so that the budgeting and allocation of tax revenues are not subject to a great deal of fluctuations.

   It is reasonable, when setting actuarial assumptions for a governmental plan to consider the impact not only on its membership, but on the taxpayers, and the agency's ability to provide

sufficient income to maintain and secure a stable funding for the benefit security of the membership. This is sometimes reflected in a more conservative approach, as experience gains are more easily absorbed into the funding than are experience losses which may result in a required increase in funding.

2. **Investment policy.** This usually refers to the plan's current asset allocation, the types of securities the system is eligible to invest in, and the target allocation, if different. It may also reflect the investment philosophy regarding risk tolerance and social investing.

3. **Reinvestment Risk**. This should reflect the reinvestment of moneys not immediately required to pay plan benefits.

4. **Investment Volatility.** If a system is required to liquidate assets at depressed values to meet benefit obligations, a higher risk is present.

5. **Investment Manager Performance.** Few investment managers consistently outperform the market. Those who consistently underperform may be replaced. We do not believe this is a significant factor to consider for COERS.

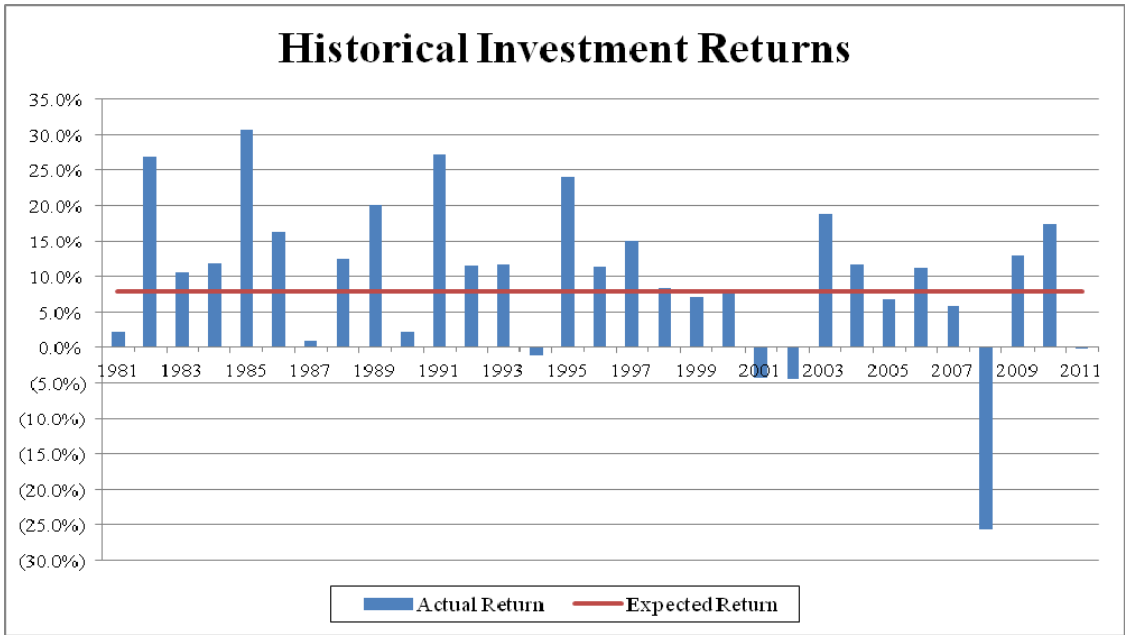
6. **Investment Expenses.** Investment returns are assumed both with and without expenses. Actual expenses are measured periodically and taken into account when setting the investment return assumption.

7. **Cash Flow Timing.** The expected stream of contributions and benefit payments may affect the liquidity of a plan's investment opportunities. In 2011, benefit payments exceed contributions by about $15 million, more than 6% of the market value of assets at the beginning of the 2011. While this trend is expected to continue absent any changes, discussions are occurring now between the City and the various member groups covered by the retirement system to address the long term funding shortfall. If contributions are increased and the benefit structure for current active members is modified, it may impact the net cash flows in a positive manner.

8. **Benefit Volatility.** This is a consideration for small plans, plans with full lump sum payment options and supplemental benefits. The concern with these factors is a need to liquidate securities at depressed values. We do not expect benefit volatility to be a factor in considering the COERS investment return assumption.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used if the year-to-year results vary widely. Even though history provides a valuable perspective for setting this assumption, the economy of the past is not necessarily the economy of the future. In addition, asset allocations may have changed over the period so returns may not be directly comparable.

The System's actual investment return on the market value of assets is shown in the graph below:



The geometric average return has varied significantly when viewed over different time periods. For example, the rate of return over the ten year period ending December 31, 2011 was 4.6%, but over the thirty year period ending December 31, 2011 the compound return was 9.6%.

Historical Market Analysis: Actual historical returns of COERS alone are not credible for the purpose of analyzing the long-term assumed future rate of return. In determining the reasonable range for this assumption, we looked 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.

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 3.0% 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.

Forward Looking Analysis

A more dynamic forward looking analysis of expected investment return is also an appropriate analysis to perform in setting this assumption. In assessing the future expectation of investment returns, we prefer to utilize the capital market assumptions of the investment professionals assisting the Board in determining its investment policies and asset allocations. This approach is referred to as the building block method in ASOP No. 27.

We are aware that the Board is considering making some changes to the target asset allocation. However, those changes had not yet been decided when work commenced on this experience study. Therefore, the current asset allocation of the fund, which is shown below, was used in our forward looking analysis of expected returns:

Asset Category	Asset Allocation	Expected Real Rate of Return (Arithmetic)	Standard Deviation
US Large Cap Equity	25%	6.90%	17.69%
US Small Cap Equity	15%	9.37%	19.10%
International Equity	25%	7.45%	17.06%
Fixed Income	25%	0.91%	4.70%
Real Estate	5%	6.27%	6.74%
Hedge Funds	5%	0.81%	0.58%
Total	100%		

The current capital market assumptions as provided by the Board's investment consultant, DeMarche Associates, are shown in Appendix C. Using the target asset allocation as shown in the table above, we assumed that investment returns approximately follow a lognormal distribution with no correlation between years. The results below provide an expected range of real rates of return over a 50 year time horizon using DeMarche's capital market assumptions. Looking at one year's results produces an expected real return of 5.62% but also has a high standard deviation or measurement of volatility illustrated by the range of results, i.e. -13.01% to 28.08%. By expanding the time horizon, the average return does not change much, but the volatility declines significantly (range for 30 year time span is 1.95% to 9.41%). The following table provides a summary of the results.

Time Span In Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	6.33%	12.54%	-13.01%	-2.45%	5.62%	14.32%	28.08%
5	5.76	5.56	-3.15	1.93	5.62	9.43	15.14
10	5.69	3.93	-0.66	3.00	5.62	8.30	12.27
20	5.65	2.78	1.14	3.76	5.62	7.50	10.28
30	5.64	2.27	1.95	4.10	5.62	7.16	9.41
50	5.63	1.76	2.77	4.44	5.62	6.81	8.54

Based on this analysis, there is 50% likelihood that the average real rate of return over a 50-year period will be 5.62%. It can also be inferred that for the 10 year time span, 5% of the resulting real rates of return were below -0.66% and 95% were above that. As the time span increases, the expected results narrow. Over a 50 year time span, the results indicate there is a 25% chance that real returns will be below 4.44% and a 25% chance they will be above 6.81%. In other words, there is a 50% chance the real returns will be between 4.44% and 6.81%.

Typically, using the building block approach of ASOP No. 27 and the projection results outlined above, a range for the investment return assumption is determined as the 25th to 75th percentile real returns over the 50 year time span plus the inflation assumption. The following table details the range using DeMarche's long term capital market assumptions.

Item	25th Percentile	50th Percentile	75th Percentile
Real Rate of Return	4.44%	5.62%	6.81%
Inflation	3.25	3.25	3.25
Net Investment Return	7.69%	8.85%	10.06%

From the table above, an 8.00% average annual return over the 50 year period ranks at the 31st percentile. In other words, there is approximately a 69% likelihood that the long term average rate of return over a 50 year period will be at least 8.00%. In conversations with DeMarche, their outlook for the short term (the next five to ten years) is lower than 8%. This means that returns in later years (after ten years) are expected to exceed 8% in order for the compound return over the long term to be more than 8%.

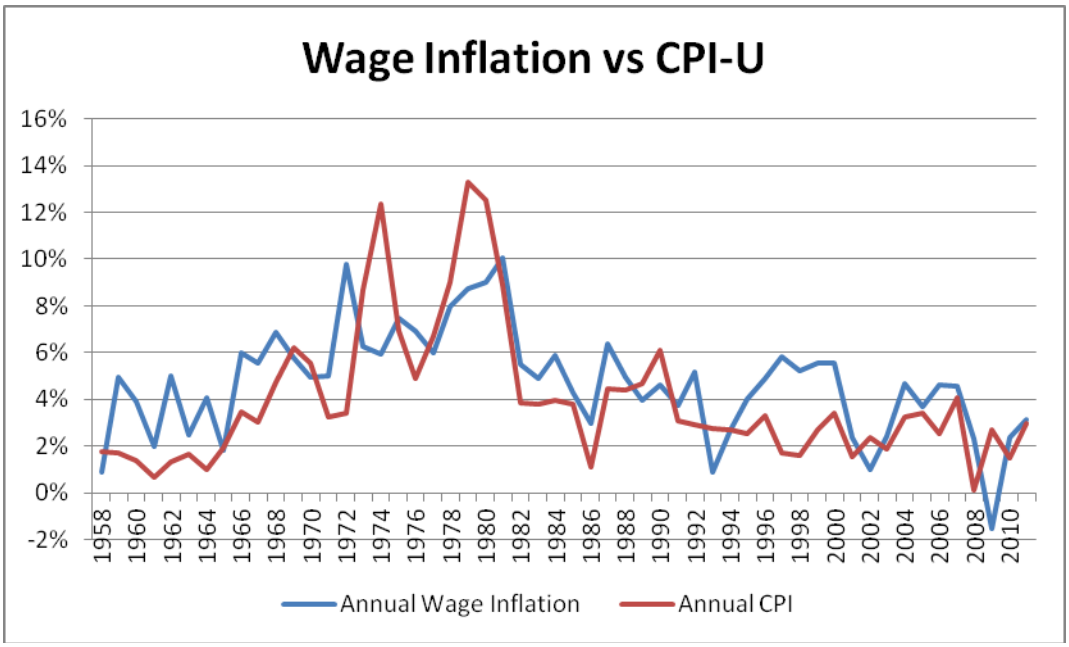
As explained earlier, we are not including a specific recommendation for the investment return assumption because the ultimate analysis and recommendation will be dependent on the plan changes made in the next few months. We will revisit the investment return assumption with the Board once the plan changes to address the System's long term funding have been finalized.

WAGE GROWTH

Use in the Valuation: The assumed future increases in salaries consist of a wage 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 price inflation is called the real rate of wage inflation (or productivity) and is the focus of our analysis.

The current wage growth assumption is 4.0% per year, which is composed of a 3.50% inflation assumption and a 0.50% productivity component.

The National Average Wage (utilized by Social Security to index the historical wages used in determining benefits) is often used for historical analysis of the overall wage growth in the United States. A graph of wage inflation, as measured by the change in the National Average Wage Growth, and price inflation, as measured by CPI-U, is shown in the following graph. As can be seen, there are a few periods where price inflation is above wage inflation, but in general wage inflation exceeds price inflation so we believe that expectation should be reflected in the actuarial assumptions.



Past Experience: The Social Security Administration publishes data on wage growth in the United States. As with our analysis of price inflation, data on wage inflation along with a comparison to price inflation over various time periods is presented in the table below. If the rate of price inflation is subtracted from the data for each year, the result is the historical real rate of wage inflation.

Period	Wage Inflation	Price Inflation	Real Wage Growth
2001-2011	2.70%	2.48%	0.22%
1991-2001	4.20	2.51	1.69
1981-1991	4.70	3.91	0.79
1971-1981	7.80	8.62	-0.82
1961-1971	4.75	3.20	1.55
1991-2011	3.45%	2.49	0.96
1981-2011	3.87	2.96	0.91
1971-2011	4.84	4.35	0.49
1961-2011	4.82	4.12	0.70

Thus over the last 50 years, annual real wage growth has averaged 0.70%. Over the last 20 years, the National Average Wage increased 3.45% on average and 2.70% over the last 10 years. Wage increases for public sector employment have fallen below private sector wage increases in recent years, a trend which may continue in the short term, but should not persist indefinitely.

Forecasts of Future Wages: The wage index we used for the historical analysis has been projected forward by the Office of the Chief Actuary of the Social Security Administration. In a report in May of 2012, the annual increase in the National Average Wage Index over the next 30 years under the intermediate cost assumptions was 4.0%, 1.2% higher than the Social Security intermediate inflation assumption. The low cost assumption was 3.6%, or 1.8% above the inflation assumption of 1.8%. The high cost assumption was 4.4%, 0.6% above the inflation assumption of 3.8%.

Reasonable Range and Recommendation: Based on our recommended inflation assumption of 3.25%, we believe that a range between 3.50% and 4.50% is reasonable for the actuarial valuation**. We recommend that the long-term assumed wage inflation rate remain at 4.0%, which implies a productivity component of 0.75%.** However, given the current economic conditions, we believe it is unlikely that general wage increases of 4.0% are likely to be granted to governmental employees until the economy fully recovers and tax revenues improve. Therefore, it may be reasonable to use a lower general wage increase assumption in the short term (called a select and ultimate assumption), particularly if the Board adopts a more conservative investment return assumption. In fact, if that occurs, the entire set of economic assumptions, including this assumption, should be revisited. We would be happy to discuss this further with the Board when we review the results of the experience study report.

A summary of the reasonable range and our recommended assumption are shown below:

	Wage Growth
Current Assumption	4.0%
Reasonable Range	3.50% - 4.50%
Recommended Assumption	4.00%*

*Although the assumption did not change, the components of the assumption did change. The price inflation assumption was lowered from 3.5% to 3.25% and the productivity assumption was increased from 0.50% to 0.75%.

DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 35 provides guidance to actuaries regarding the selection of demographic and other non-economic assumptions for measuring pension obligations. A revised edition of this standard was adopted by the Actuarial Standards Board of the American Academy of Actuaries in September 2010, effective for actuarial valuations with a measurement date on or after June 30, 2011.

ASOP 35 General Considerations and Application

Each individual demographic assumption should satisfy the criteria of ASOP 35. In selecting demographic assumptions the actuary should also consider: the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 35.

Overview of Analysis

The purpose of a study of demographic experience is to compare what actually happened to the individual members of the System during the study period (calendar years 2007 through 2011) with what was expected to happen based on the actuarial assumptions. A single five year period is still a relatively short observation period, particularly given the size of the group. In addition, the study period includes the economic downturn in 2008 and 2009. Therefore, some of the experience observed in the study may not be representative of long term trends. In addition, the System's size limits the credibility of the findings. Therefore, we have considered the results of the prior Experience Study when deemed appropriate.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the study is tabulated by age, duration, gender, group, and membership class (active, retired, etc.).

- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.

- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio), and is expressed as a percentage.

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Judgment is required to anticipate future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

It takes a fair amount of data to provide experience study results that are fully credible for demographic assumptions. Because the membership or certain subsets of the membership are relatively small, some

assumptions have been selected based more on our professional judgment of reasonable future outcomes than actual experience.

ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Pursuant to ASOP 35 the actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.

2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.

3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age or service. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.

4. Select the specific assumptions. In selecting an assumption the actuary should consider the potential impact of future plan design as well as the factors listed above.

5. Evaluate the reasonableness of the selected assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

MORTALITY

One of the most important demographic assumptions is mortality because this assumption predicts when retirement payments will stop. The life expectancies of current and future retirees are predicated on the assumed rates of mortality at each age. It is commonly known that rates of mortality have been declining, which means people, in general, are living longer.

ASOP 35 states that the actuary should consider the effect of mortality improvement both prior to and subsequent to the valuation date. This implies the need to make a specific assumption with respect to future improvements in mortality, even if the assumption is zero future improvement. It is an established trend that people are living longer and we believe that trend will continue. Therefore, we believe it is appropriate to reflect future mortality improvements in the mortality assumption. Sometimes this is accomplished by including a "margin" in the rates (predicting fewer deaths than are actually occurring in the present experience). This results in a ratio of actual to expected deaths (A/E ratio) of over 100%. Another way to reflect the trend in long term mortality improvements is to use generational mortality where the probability of death at a given age is projected to be lower each year in the future.

Healthy Retirees: The valuation currently uses separate mortality assumptions for male and female members. The RP-2000 Healthy Annuitant Mortality Table for Males and Females, with generational mortality using Projection Scale AA to anticipate mortality improvements in future years, with ages set forward one year (so an individual who is age 65 is assumed to have the mortality of a 66-year old) is used to predict the probability of death for members receiving benefits.

In examining the results of the Experience Study, if the A/E Ratio is greater than 100% the assumptions have predicted fewer deaths than actually occurred and with an A/E Ratio less than 100% the assumptions have predicted more deaths than have actually occurred. Sometimes a mortality table is selected with the explicit purpose of anticipating fewer deaths so there is room for mortality improvements in the future (called "margin"). However, using the RP-2000 Mortality Table with generational mortality, the A/E Ratio should be around 100% as mortality improvements in future years are directly reflected in the valuation process by projecting lower mortality rates in future years so no margin is needed.

The aggregate observed experience for healthy (not disabled) male and female retirees during the study period is shown in the following chart. There is an insufficient number of disabled retirees to provide any reasonable analysis for the group so that information is not shown.

	All Healthy Retirees		
	Observations		A/E Ratio
	Actual	**Expected**	**Current**
Males	89	86	103%
Females	43	30	143%

Actual deaths for healthy males were slightly higher than the number expected (89 compared to 86 over a five year study period) based on the current assumption with a resulting A/E ratio of 103%. We also analyzed the data by year as shown in the following table. Due to the small size of the group, there is considerable volatility in results from year to year. A similar pattern was observed in the last experience study.

	Healthy Male Retirees		
	Observations		A/E Ratio
Year	**Actual**	**Expected**	**Current**
2007	10	16	63%
2008	21	17	124%
2009	14	17	82%
2010	24	18	133%
2011	20	18	111%
Total	89	86	103%

Over the entire study period actual deaths for females were significantly higher than the expected number. At first glance, these results suggest that female mortality rates may be too low – that is, females are not living as long as expected. However, when the data was analyzed by year the number of actual and expected deaths was very close in all but one year (2008). If 2008 is excluded, the resulting A/E ratio is close to 100%. Based on this information, along with the relatively small size of the group, which increases the likelihood of volatility in the results, we recommend the current assumption for both males and females be retained.

	Healthy Female Retirees		
	Observations		A/E Ratio
Year	**Actual**	**Expected**	**Current**
2007	8	6	133%
2008	19	6	317%
2009	5	6	83%
2010	6	6	100%
2011	5	6	83%
Total	43	30	143%

We would note that the Society of Actuaries is in the process of developing a new mortality table that would replace the RP-2000 Table. In the interim, they have issued a new mortality improvement projection scale table, Scale BB, to replace the existing Scale AA. For the ages of the COERS retirees, Scale BB generally projects more mortality improvement in the future, and thus would predict fewer deaths. Because the observed deaths in the most recent five years indicate that Scale AA has closely modeled actual experience, we have not recommended a change at this time. However, the Board may wish to adopt Scale BB at this time because it reflects broader trends in mortality that cannot be detected in a smaller group of retirees such as the COERS retirees.

We recommend the postretirement mortality assumption remain the same as the current assumption, i.e. the RP-2000 Healthy Annuitant Mortality Table for males and females (ages set forward one year) with generational mortality improvements anticipated by Projection Scale AA.

Beneficiaries: The mortality of beneficiaries applies to the survivors of members who have elected a joint and survivor option. There is typically little data on the mortality experience of beneficiaries prior to the death of the member because there is no requirement that the death be reported. **Therefore, we recommend that standard convention be followed and mortality for beneficiaries be the same basis as is used for retired members.**

Disabled Members: The valuation assumes that disabled members, in general, will not live as long as retired members who met the regular service retirement eligibility. There is an insufficient number of disabled retirees to provide statistically reliable results since there were only 9 deaths during the study period. The table currently used is a standard table that should be appropriate for the System. **We recommend the disabled mortality assumption remain unchanged, i.e. the RP-2000 Disabled Annuitant Mortality Tables for males and females with generational mortality improvements anticipated by Scale AA**.

Active Members: This assumption predicts eligibility for death benefits prior to retirement, rather than the expected lifetime for pension payments. In smaller groups, the mortality rates for active members are often set based on the same assumption as is used for healthy retirees. Given the low probability of death while active, the results cannot be credible on their own without much larger numbers of employees than are in COERS. We prefer to keep the mortality assumption for active and retired members on a consistent basis. **Therefore, we recommend the active member mortality be set to the RP-2000 Employee Mortality Table for males and females with a 1 year set forward and Scale AA to anticipate mortality improvements in future years.**

SERVICE RETIREMENT

Service retirement measures the change in status from active membership directly to retirement. This assumption does not include the retirement patterns of members who terminated from active membership years prior to their retirement. A separate assumption addresses that situation.

Members of the Omaha Employees' Retirement System are eligible to retire on or after age 50 if their age plus service is 80 or more (referred to as Rule of 80). Otherwise, a member may retire on or after age 55 with 5 years of service. The benefit amount is reduced 8% per year for commencement prior to age 60 unless the Rule of 80 is met. Separate retirement assumptions are used for early retirement, retirement when the member is first eligible for unreduced benefits (referred to as the "select" period) and then after the initial year the member is eligible for unreduced benefits (referred to as the "ultimate" period) if they are still working.

We analyzed retirements for those eligible for each type of retirement, i.e. early (reduced) retirement, those in their first year of eligibility for unreduced retirement, and those who have been eligible for unreduced retirement for over a year. Our findings are summarized in the following table:

	All Retirements 2007 Through 2011				
	Observations			A/E Ratio	
	Actual	Expected	Proposed	Current	Proposed
Early Retirement	19	29	N/A	66%	N/A
1st Year Eligible for Unreduced Benefit	66	71	72	93%	92%
After 1st Year Eligible for Unreduced Benefit	116	198	157	59%	74%
Total	201	298	258	67%	78%

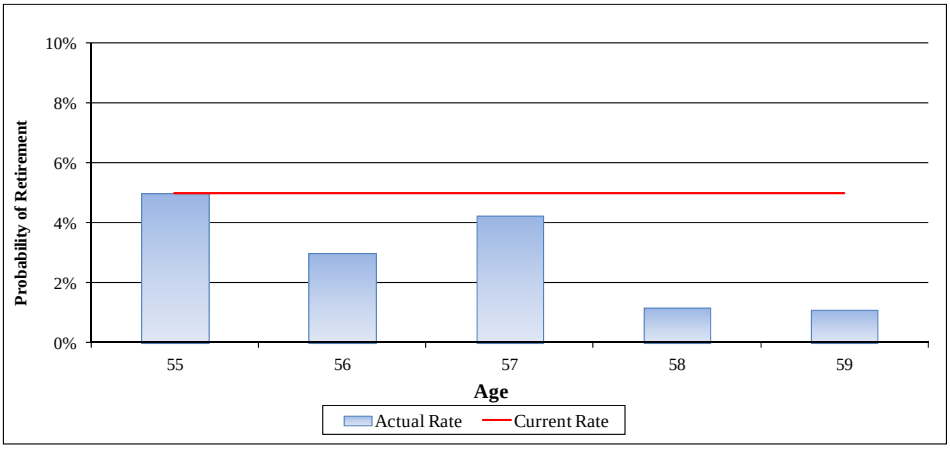
The data was further reviewed by analyzing the actual and expected experience for each year in the study period to see if any anomalies were evident. The study period included several years during a period of significant economic downturn. The low A/E ratios suggests that those eligible to retire may have delayed retiring in the face of economic uncertainty. Thus, we believe it is appropriate to be cautious in making any adjustments to the retirement rates based on the results of this study period alone.

The results by year for each type of retirement are shown in the tables on the following pages. In addition, graphs illustrating the actual rate, current assumption and proposed assumption are also included. It should be noted that while overall actual retirement rates were below those expected, at the younger ages there were actually more retirements than expected. Based on these results, we believe there are some adjustments to the retirement rates that are warranted.

	Early Retirements		
	Observations		A/E Ratio
	Actual	Expected	Current
2007	3	6	50%
2008	4	5	80%
2009	7	6	117%
2010	3	6	50%
2011	2	6	33%
Total	19	29	66%

The actual retirement rates for early retirement are compared to the current actuarial assumptions in the graph below:

Early Retirement



The current early retirement rates are fairly low, 5% per year. However, during the study period there were 19 actual retirements compared to 29 expected, with a resulting A/E ratio of 66%. Although the A/E ratio appears low, it is important to remember that the number of retirements is small. One additional retirement in each year would have moved the A/E ratio from 66% to 83%. In addition, the prior experience study indicated that the current assumption resulted in an A/E ratio of 100%. We believe the unusual economic conditions during this study period may have impacted the actual experience. **Therefore, we recommend the current retirement rates for early retirement be retained.**

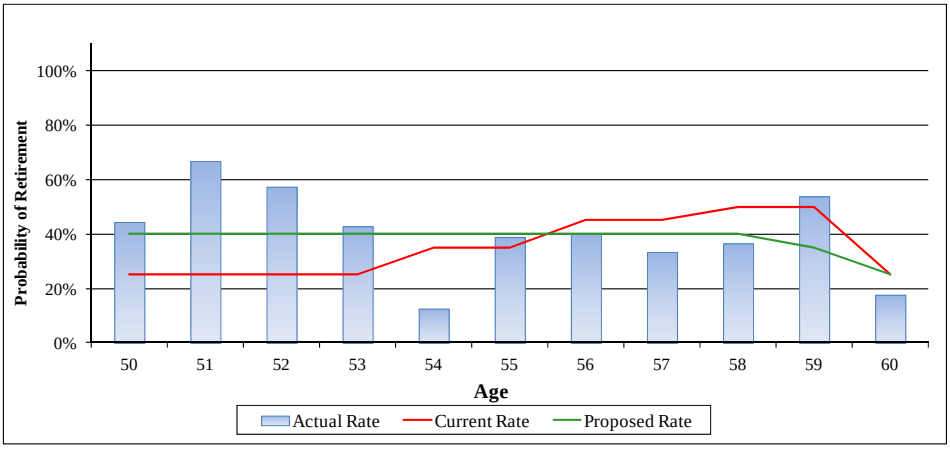
The following table shows the number of members who retired when they first reached the age at which retirement benefits could be paid without a reduction (earliest unreduced retirement age) regardless of whether they met it under the Rule of 80 provision or the age 60 provision.

	1st Eligible for Unreduced Benefits		
	Observations		A/E Ratio
	Actual	Expected	Current
2007	13	15	87%
2008	19	17	112%
2009	9	13	69%
2010	16	16	100%
2011	9	10	90%
Total	66	71	93%

While the overall A/E ratio is 93%, the "fit" of actual to expected experience is not good. In addition, actual retirements in 2009 were very low, likely due to the economic conditions.

The actual retirement rates for service retirements in the first year of eligibility are compared to the current and proposed actuarial assumptions in the following graph:

1st Year Eligible for Unreduced Benefits
(Select Period)



In the last experience study, the current assumption resulted in an A/E ratio of 122% indicating there were more retirements in that study period than the assumption would have anticipated. During the current study period, overall there were slightly fewer retirements in the select period than expected (63 actual vs 71 expected with an A/E ratio of 93%). When the actual experience is viewed by age, the current assumption does not appear to be a good fit. In both the prior and current study periods, the actual retirement rates at the younger ages were higher than the assumed rates and actual retirements at the older

ages were lower than expected. Retirement at younger ages generally produces higher liabilities, so it is important to accurately reflect earlier benefit commencement if that is expected to continue. **We recommend the current rates be adjusted to better fit the observed experience, as shown in the green line in the graph above. The resulting A/E ratio using the recommended assumption changes slightly to 92%, but the fit to actual experience is much better.**

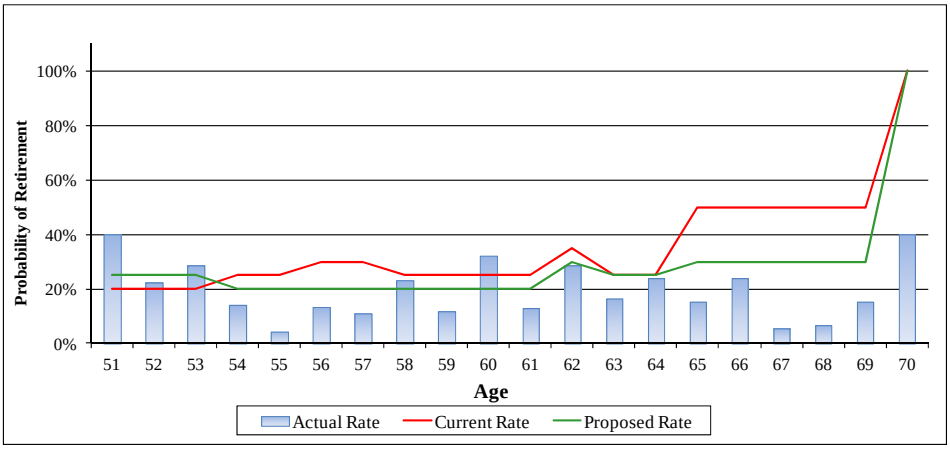
The actual retirement experience, by year, for those who retired at least one year after reaching their earliest unreduced retirement date (ultimate retirement rates) is summarized in the table below:

	After 1st Eligible for Unreduced Benefits		
	Observations		A/E Ratio
	Actual	Expected	Current
2007	23	34	68%
2008	27	38	71%
2009	19	39	49%
2010	28	42	67%
2011	19	45	41%
Total	116	198	59%

The actual retirements under the ultimate retirement were lower than expected in each of the five years in the study period. Calendar year 2009 could likely have been impacted by the economic conditions at the time, but there were also significantly fewer retirements in 2011. There appears to be a consistent pattern of fewer than expected retirements over the entire study period.

The actual retirement rates for service retirements after the first year of eligibility for unreduced benefits are compared to the current and proposed actuarial assumptions in the following graph:

After 1st Year Eligible for Unreduced Benefits (Ultimate)



In the prior experience study, this assumption resulted in an A/E ratio of 106%, with the assumed rates below the actual observed experience for ages 51 through 55. In the current study period, we also observed retirement rates that were higher than the current assumption at ages 51 through 55. The current assumption also reflects rates that were much higher than actual experience for most of the ages from 65 through 69. As a result, **we are recommending some changes to the current assumption, as shown in the prior graphs, to better fit the actual experience observed in the last two studies.** The resulting A/E ratio using the new assumption is 74%.

Inactive Vested Members: The current assumption is that inactive vested members will retire at age 60. There are few such members so no reliable data is available to evaluate this assumption. However, since age 60 is the first age at which benefits can commence unreduced, it is reasonable to expected most, if not all, of these members to retire at that time. **We recommend keeping the current assumption that benefits for inactive vested members will commencement at age 60 as it is a reasonable assumption and provides a conservative estimate of the liability for inactive vested members.**

DISABILITY

The size of the System, coupled with the small probability of disablement at most ages, does not permit credible derivation of disability rates based solely on the System's experience. Nonetheless, the actual to expected ratio was calculated. The following table shows both the experience in the prior and the current study.

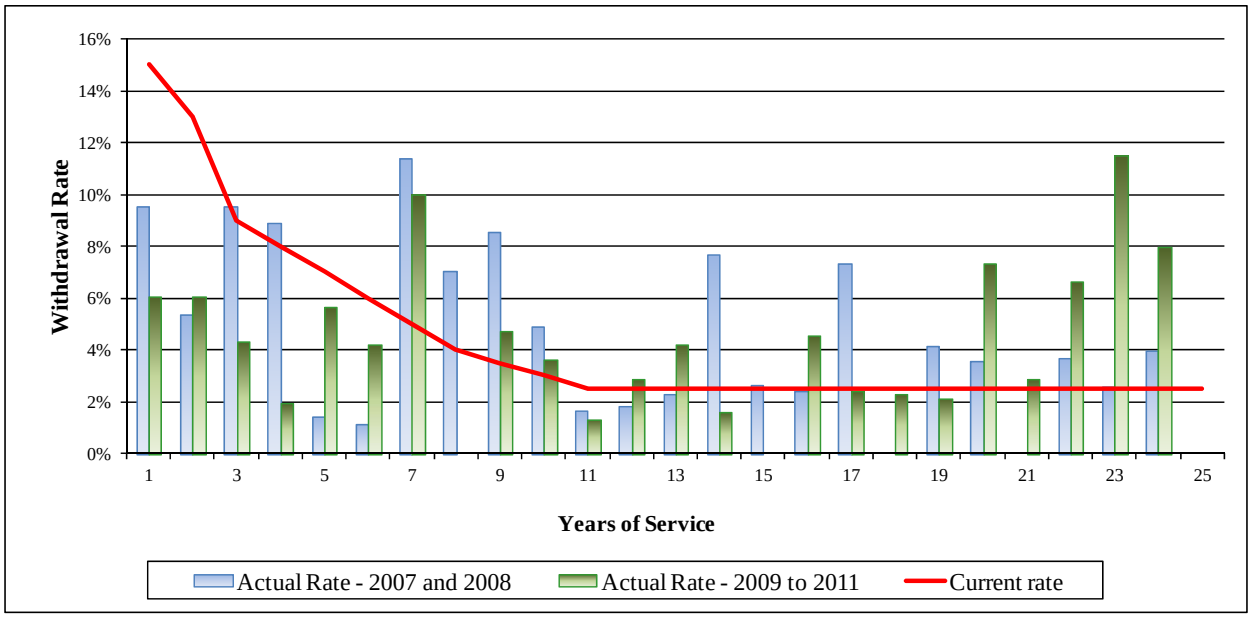
	Disabilities		
	Observations		A/E Ratio
	Actual	Expected	Current
2002-2006	30	27	111%
2007-2011	11	9	122%
Total	41	36	114%

Over the last two experience studies, the current assumption reasonably anticipated the actual number of disabilities (five more disabilities than expected over a ten year period). **Therefore, we recommend the current disability rates be retained.**

TERMINATION OF EMPLOYMENT

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, retirement, or disability. Rates of termination can vary by both age and years of service. In general, rates of termination tend to be highest at younger ages and in the early years of employment. In the last experience study, this assumption was changed from an age based assumption to an assumption based on years of service. The current termination of employment rates start at 15% in the first year and grade down to 2.5% at 11 or more years of service. The last experience study showed an A/E ratio of 84% using this assumption, indicating that the assumption was not set to exactly match the observed experience (actual terminations were less than expected using the assumption). Given that this is the first experience study since the assumption was changed to a service based assumption, the need for adjustment is not unexpected.

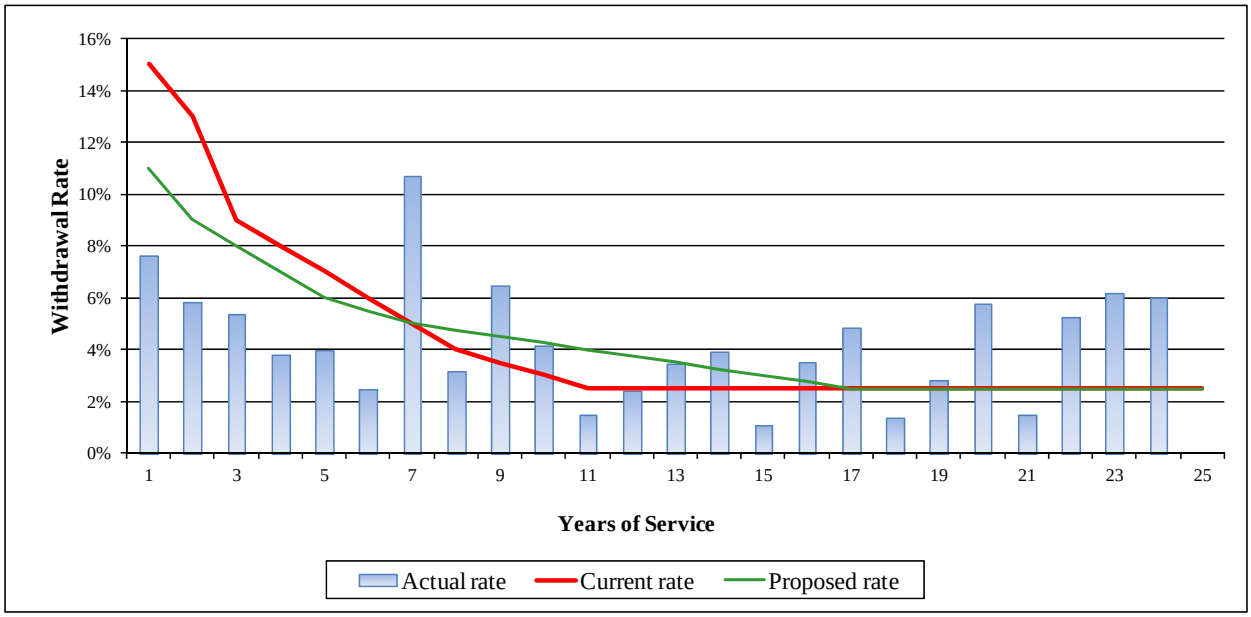
As was noted earlier in this report, the current study period (2007 through 2011) included several years of severely bad economic conditions, which likely is not representative of the long term experience in the future. Since termination of employment often involves a decision by the member to voluntary leave covered employment, the actual experience can be heavily influenced by economic conditions. In order to analyze the experience in a more comprehensive manner, the study period was divided into two periods to determine if there were material differences in the observed experience. The following graph indicates that the actual experience in the two periods was different, especially at the lower service durations. The blue bars are the actual rates of termination in 2007 and 2008 while the green bars are the actual rates of termination in 2009 through 2011. In general, the green bars are below the blue bars at most durations.



When the current termination of employment assumption was developed in the last experience study, the recommended termination rates were higher than the actual observed experience (the A/E ratio was 84%). During the current study period there were also fewer terminations than expected (actual rates were lower than the assumed rates) even when the 2009 through 2011 experience is excluded. Overall, the A/E ratio for the current five year period was 70%, but the ratio was 85% for 2007 through 2008 and 62% for 2009 through 2011 as the following table shows:

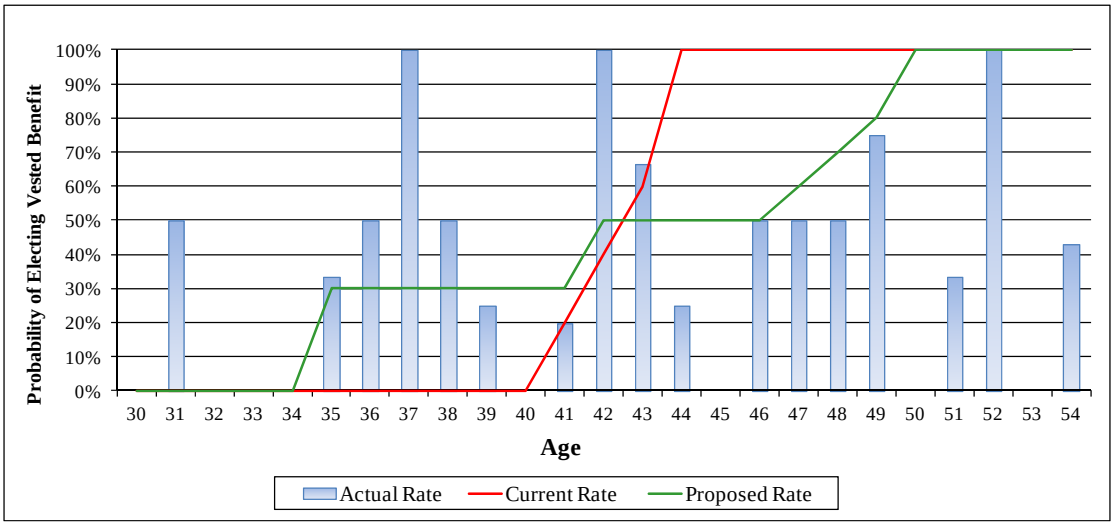
	Terminations				
	Observations			A/E Ratio	
	Actual	Expected	Proposed	Current	Proposed
2007-2008	79	93	82	85%	97%
2009-2011	93	151	130	62%	71%
Total	172	244	212	70%	81%

Based on the observed data, we are recommending some revisions to the termination of employment assumption to better match the experience in the prior study and that observed in 2007 and 2008. Given the economic conditions, little credibility was assigned to the results in 2009 through 2011. **Therefore, we recommend the termination of employment rates be adjusted during the first 16 years of employment, as shown in the following graph:**



Withdrawal of Employee Contributions by Vested Terminating Members

For vested members who terminate employment, an age-based assumption is utilized to anticipate whether they will leave their member contributions with the System and receive a deferred benefit or elect to take a refund of the contributions and forfeit future benefits. Members who terminated in the last year of the study were excluded from our analysis due to potential timing issues. There may have been insufficient time to process their refund and thus it may not appear in the data, thus skewing the results. There were 73 vested members under age 55 who terminated employment during the five year study period. Based on the current assumption, we expected 34 of them to take a deferred benefit, while 27 actually did with a resulting A/E ratio of 79%. (Note that some of them could have elected to withdraw their contributions in years not included in the study period.) Additional analysis of the actual versus expected experience by age indicates the fit could be improved (see graph below). **Therefore, we recommend some modifications to the current assumption as shown in the following graph.** The recommended assumption only moves the A/E ratio to 82%, but the fit of the assumption to actual experience improves.



SALARY INCREASE ASSUMPTION

Estimates of future salaries are based on assumptions for two types of increases:

1. Increases in each individual's salary due to promotion or longevity (often called merit scale), and
2. Increases in the general wage level of the membership, which are directly related to price and wage inflation.

Earlier in this report, we recommended that the second of these rates, general wage inflation be left at 4.00% (3.25% price inflation and 0.75% real wage growth).

As noted above, future salary increases are the result of two components. Actual salary experience is reported in total, rather than by components, so the experience study reviewed total salary increases for the study period. The percentage attributable to general wage growth (which has already been analyzed and an assumption set) is eliminated so the merit scale is isolated. In order to isolate the merit scale, we determined the "across the board" increases that were granted during the study period.

Actual Across the Board Increases					
Year	Administrative &Executive	Civilian Bargaining	Civilian Management	Functional Positions	Expected Increase (all Groups)
2007	4.5%	2.5%	2.5%	3.25%	4.0%
2008	2.5%	2.5%	2.5%	0.75%	4.0%
2009	0.0%	0.0%	0.0%	1.53%	4.0%
2010	0.0%	0.0%	0.0%	2.75%	4.0%
2011	2.5%	3.5%	3.5%	2.75%	4.0%
2007-2011	1.9%	1.7%	1.7%	2.2%	4.0%

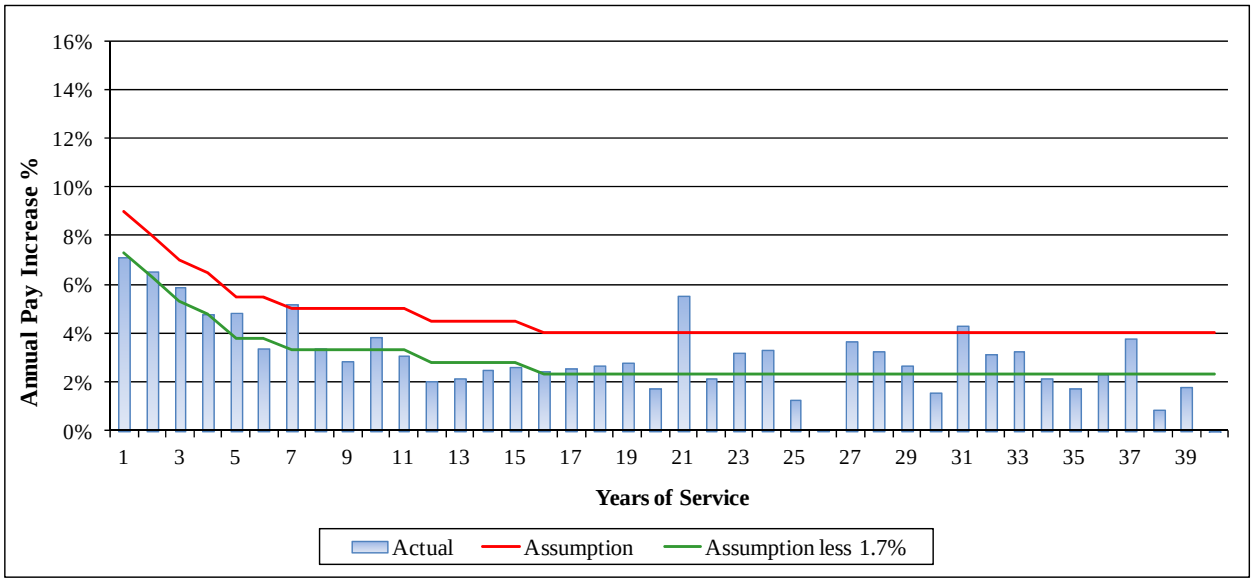
The Civilian Bargaining and Civilian Management groups compose the majority of the active members in the retirement system so more weight is assigned to the experience for that group. As can be observed in the table above, actual general wage increases during the study period for those two groups was 1.7%. The change in the national Average Wage Index for the same period was 2.1%. The actual experience was considerably lower than the actuarial assumption of 4.0%. Given this information, we would expect the total salary increases during the study period to be, on average, about 2% lower than the increase expected based on the current actuarial assumption.

As has been previously noted, the economic environment during this study period was very atypical. There was considerable pressure on government budgets to reduce expenses as revenues declined. As a result, salary increases for many public employees have been very low in recent years. To isolate this potential impact, we compared individual salary increases for all members active in any two consecutive periods (e.g. 2006 and 2007, 2007 and 2008, etc.). The results for the years in the current study period are shown in the following table:

	Total Salary Increases		
Year	Actual	Expected	Difference
2007	6.09%	5.16%	0.93%
2008	5.36%	5.33%	0.03%
2009	1.33%	5.36%	(4.03%)
2010	4.29%	5.40%	(1.11%)
2011	2.43%	5.40%	(2.97%)
2007-2011	3.83%	5.33%	(1.50%)

Recognizing that the economic conditions during much of the study period were unusual, we are hesitant to make significant adjustments to the salary scale based on the findings in this report. We can, however, analyze the pattern of pay increases to see how well our current merit scale (total salary scale less general wage increase of 4%) fits the actual experience. If the current merit scale is a good fit, we should see a pattern of pay increases by service that is the same general shape as the current assumption, but just lower.

The following graph shows the observed increases for all years (the bars) compared to the current assumption (the red line). Recognizing that the across the board increases during the study period were roughly 2% below the expected increase, we have included an adjusted assumption (the green line) which is simply the current assumption less 2%. As can be seen, the shape of the assumption/adjusted assumption lines and the actual salary increases exhibit a similar pattern. We believe this supports the continued use of the current merit salary scale assumption.



Since we find the fit of the merit scale to be adequate and we earlier recommended that the payroll growth assumption remain at 4%, it follows that we believe that the current salary scale is a reasonable assumption for the long term. **We recommend that the current salary increase assumption continue to be used.**

Interest: 8.00% per year, net of investment expenses.

Inflation: 3.5% per year, net of investment expenses.

Salary Increases:

Years of Service	Annual Rate of Increase For Sample Years: Inflation	Productivity	Merit & Longevity	Total Increase
1	3.5%	.5%	6.0%	10.0%
5	3.5%	.5%	2.5%	6.5%
10	3.5%	.5%	1.0%	5.0%
15	3.5%	.5%	0.5%	4.5%
20+	3.5%	.5%	0.0%	4.0%

Payroll Growth Assumption 4.0%

Service Retirement Age

Eligible for Unreduced Retirement: Age	1st Year Eligible	Subsequent Years
50-53	25%	20%
54-55	35%	25%
56-57	45%	30%
58-59	50%	25%
60	25%	25%
61		25%
62		35%
63		25%
64		25%
65-69		50%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 5% per year from age 55 to 59.

Mortality:

Active Members RP-2000 Employee Table with generational improvements using scale AA, set forward one year

Pensioners RP-2000 Healthy Annuitant Table with generational improvements using scale AA, set forward one year

Disabled RP-2000 Disabled Table with generational improvements

Disability:

Age	Annual Rate
20	0.11%
30	0.14%
40	0.19%
50	0.41%
60	1.48%

Percent Married at Death or Retirement: 75%

Number of Children per Married Member: 0

Termination:

SAMPLE RATES

Years of Service	Annual Rate
1	15%
5	7%
10	3%
11+	2.5%

Assets: Actuarial Value of Assets equals 75% of Expected Value plus 25% of Market Value.

Vested Terminations Electing Refund:

Age	Percent
40 and Below	100%
41	80%
42	60%
43	40%
44 and Above	0%

Interest: 8.00% per year, net of investment expenses.

Inflation: 3.25% per year, net of investment expenses.

Salary Increases:

Years of Service	Annual Rate of Increase For Sample Years: Inflation	Productivity	Merit & Longevity	Total Increase
1	3.25%	.75%	6.0%	10.0%
5	3.25%	.75%	2.5%	6.5%
10	3.25%	.75%	1.0%	5.0%
15	3.25%	.75%	0.5%	4.5%
20+	3.25%	.75%	0.0%	4.0%

Payroll Growth Assumption 4.0%

Service Retirement Age

Age	Eligible for Unreduced Retirement: 1st Year Eligible	Subsequent Years
50-53	40%	25%
54-58	40%	20%
59	35%	20%
60	25%	20%
61		20%
62		30%
63-64		25%
65-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 5% per year from age 55 to 59.

Mortality:

Active Members RP-2000 Employee Table with generational improvements using scale AA, set forward one year

Pensioners RP-2000 Healthy Annuitant Table with generational improvements using scale AA, set forward one year

Disabled RP-2000 Disabled Table with generational improvements

Disability:

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20	0.11%
30	0.14%
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50	0.41%
60	1.48%

Percent Married at Death or Retirement: 75%

Number of Children per Married Member: 0

Termination:

SAMPLE RATES

Years of Service	Annual Rate
1	11.00%
5	6.00%
10	4.25%
15	3.00%
17+	2.50%

Assets: Actuarial Value of Assets equals 75% of Expected Value plus 25% of Market Value.

Vested Terminations Electing Refund:

Age	Percent
34 and Below	100%
35-41	70%
42-46	50%
47	40%
48	30%
49	20%
50 and Above	0%

Model Inputs - 2012

Assumes 3.1% long-term inflation rate.

Asset Class	Expected Return	Standard Deviation	Geometric Return	Asset Class	Expected Return	Standard Deviation	Geometric Return
Large Cap Stocks	9.0	18.5	7.4	Emerging Mkt Debt	8.0	11.2	7.4
Mid Cap Stocks	9.4	20.5	7.5	TIPS	5.1	6.0	4.9
Small Cap Stocks	10.3	24.0	7.7	Cash Equivalents	4.1	1.5	4.1
International Stocks	9.2	20.0	7.4	Private Real Estate	8.6	7.5	8.3
International Small Cap Stocks	10.5	24.7	7.7	Public REITS	9.5	21.0	7.5
Emerging Markets Stocks	12.0	29.0	8.2	Venture	15.0	30.0	11.0
Long Bonds	6.5	11.3	5.9	Buyouts	13.0	18.0	11.6
Intermediate Bonds	6.6	6.7	6.4	Mezzanine	11.0	11.5	10.4
Short Bonds	5.9	4.0	5.8	Distressed Debt	11.0	13.0	10.2
High Yield Bonds	8.4	11.0	7.8	Hedge Funds Conservative	7.2	6.5	7.0
International Bonds	7.0	11.0	6.4	Hedge Funds Strategic	9.0	9.0	8.6
Bank Loans	6.8	8.0	6.5	Commodities	10.0	20.0	8.2

Asset Class Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Large Cap Stocks	1.00																							
2. Mid Cap Stocks	0.92	1.00																						
3. Small Cap Stocks	0.88	0.94	1.00																					
4. International Stocks	0.73	0.69	0.62	1.00																				
5. International Small Cap Stocks	0.66	0.66	0.66	0.90	1.00																			
6. Emerging Markets Stocks	0.69	0.71	0.75	0.69	0.72	1.00																		
7. Long Bonds	0.26	0.15	0.18	0.22	-0.07	-0.15	1.00																	
8. Intermediate Bonds	-0.08	-0.13	-0.19	0.27	0.12	-0.18	0.98	1.00																
9. Short Bonds	0.09	0.01	0.04	0.07	-0.33	-0.29	0.81	0.91	1.00															
10. High Yield Bonds	0.62	0.62	0.62	0.56	0.56	0.61	0.14	0.15	-0.04	1.00														
11. International Bonds	-0.08	-0.13	-0.19	0.27	0.12	-0.16	0.51	0.54	0.49	0.04	1.00													
12. Bank Loans	0.55	0.56	0.52	0.55	0.59	0.51	-0.27	-0.23	-0.35	0.84	-0.13	1.00												
13. Emerging Mkt Debt	0.52	0.53	0.52	0.44	0.36	0.61	0.13	0.13	-0.02	0.48	-0.08	0.29	1.00											
14. TIPS	-0.27	-0.20	-0.27	-0.20	-0.07	-0.08	0.40	0.54	0.43	0.13	0.27	0.13	0.134	1.00										
15. Cash Equivalents	-0.03	0.01	-0.07	-0.08	-0.18	-0.04	0.01	0.10	0.39	-0.06	0.05	-0.055	0.016	0.01	1.00									
16. Private Real Estate	0.10	0.06	0.05	0.12	0.09	0.00	-0.13	-0.12	0.00	-0.09	-0.06	0.023	-0.005	0.03	0.43	1.00								
17. Public REITS	0.55	0.58	0.66	0.53	0.56	0.43	0.12	0.08	-0.06	0.59	0.07	0.575	0.389	0.08	-0.04	0.19	1.00							
18. Venture	0.48	0.47	0.49	0.32	0.23	0.35	-0.08	-0.10	-0.11	0.16	-0.18	0.168	0.325	-0.14	0.07	0.14	0.12	1.00						
19. Buyouts	0.63	0.54	0.56	0.49	0.49	0.48	-0.20	-0.25	-0.33	0.29	-0.31	0.422	0.438	-0.12	0.00	0.21	0.40	0.40	1.00					
20. Mezzanine	0.33	0.32	0.34	0.28	0.22	0.30	-0.14	-0.17	-0.23	0.23	-0.11	0.177	0.208	0.01	0.08	0.21	0.26	0.50	0.38	1.00				
21. Distressed Debt	0.71	0.73	0.75	0.70	0.74	0.68	-0.22	-0.26	-0.43	0.75	-0.15	0.692	0.513	0.06	-0.05	0.19	0.66	0.35	0.64	0.30	1.00			
22. Hedge Funds Conservative	0.65	0.66	0.62	0.62	0.52	0.60	-0.15	-0.15	-0.27	0.62	-0.19	0.655	0.507	0.14	0.24	0.34	0.46	0.58	0.67	0.51	0.83	1.00		
23. Hedge Funds Strategic	0.56	0.58	0.55	0.46	0.37	0.57	-0.01	-0.01	-0.06	0.41	-0.08	0.442	0.453	-0.03	0.24	0.05	0.31	0.62	0.44	0.34	0.60	0.76	1.00	
24. Commodities	0.15	0.19	0.14	0.32	0.38	0.29	-0.17	-0.15	-0.25	0.33	0.00	0.492	0.195	0.35	-0.01	0.24	0.32	0.16	0.25	0.27	0.46	0.54	0.25	1.00