The Police Retirement System of St. Louis

Actuarial Valuation as of October 1, 2013

Produced by Cheiron

February 14, 2014

CHEIRON Classic Values, Innovative Advice

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LETTER OF TRANSMITTAL

February 14, 2014

Board of Trustees
The Police Retirement System of St. Louis
2020 Market Street
St. Louis, Missouri 63101

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of The Police Retirement System of St. Louis as of October 1, 2013. The valuation is organized as follows:

- In Section I **Board Summary,** we describe the purpose of an actuarial valuation and summarize the key results found in this valuation.
- The **Main Body** of the report presents details on the System's:
  - Section II - Assets
  - Section III - Liabilities
  - Section IV - Contributions
  - Section V - Accounting Statement Information (GASB)
- In the **Appendices,** we conclude our report with detailed information describing the System's membership (Appendix A), actuarial assumptions and methods employed (Appendix B), and a summary of pertinent plan provisions (Appendix C).

The results of this report rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly.

In preparing our report, we relied on information (some oral and some written) supplied by The Police Retirement System of St. Louis staff. This information includes, but is not limited to the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice as set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

The actuarial assumptions (except for the assumed interest on member contributions) are the same as for the prior year. These assumptions were used by the prior actuary and were based upon an experience study performed by the prior actuary for the five-year period ending September 30, 2010. While Cheiron does not believe that any of these assumptions are unreasonable, we cannot certify with regard to the appropriateness of the assumptions until we have completed the next experience study.

This report was prepared for The Police Retirement System of St. Louis for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. This valuation report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Stephen McElhaney, FCA, FSA, MAAA
Principal Consulting Actuary

Mike Noble, FCA, FSA, MAAA
Principal Consulting Actuary

SECTION I
BOARD SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe and identify as of the valuation date:

- The financial condition of the System,
- Past and expected trends in the financial progress of the System,
- The employer's contributions for Fiscal Year ending 2014, and
- Information required by the Governmental Accounting Standards Board (GASB).

In the balance of this Board Summary we present the basis upon which this year's valuation was completed, and the key findings of this valuation including a summary of all key financial results.

Valuation Basis

This October 1, 2013 valuation represents Cheiron's second valuation performed for The Police Retirement System of St. Louis. There were no changes to the actuarial methods or plan provisions since the October 1, 2012 valuation. The assumed crediting rate for member contributions changed from 6% to 4%.

Key Findings of this Valuation

The key results of the October 1, 2013 actuarial valuation are as follows:

- The Funding Policy Contribution Requirement decreased from $32,629,036 as of October 1, 2012 to $32,324,823 as of October 1, 2013. This translates to a rate as a percent of total compensation increase from 43.06% as of October 1, 2012 to 44.07% as of October 1, 2013.
- The unfunded Entry Age Normal (EAN) actuarial liability for The Police Retirement System of St. Louis (PRS) decreased from $191 million on October 1, 2012 to $189 million on October 1, 2013.
- The System's funding ratio based on the Entry Age Normal actuarial liability, the ratio of actuarial asset value to the EAN actuarial liabilities increased from 77.9% as of October 1, 2012 to 78.5% as of October 1, 2013. The reasons for this improvement were as follows:
  - There was an expected decrease in the EAN unfunded actuarial liability of $9.6 million from the employer and employee contributions made during the plan year.
  - During the year ended September 30, 2013, the System's assets earned 12.02% on a market value basis, but due to smoothing of prior investment losses, the return on the actuarial asset value was 5.54% (as compared to 7.75% assumed). This resulted in an actuarial loss on investments of $9.5 million.
  - On the liability side, the System experienced a total gain of $1.6 million. One component of this gain is from salary increases being less than expected for continuing active participants. There is an additional gain from participants not retiring as early as expected.

SECTION I
BOARD SUMMARY

Table I-1 below summarizes all the key results of the valuation with respect to the System's membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior plan year.

TABLE I-1
The Police Retirement System of St. Louis
Summary of Principal Results

Valuation as of:	October 1, 2012	October 1, 2013	% Change
Participant Counts			
Active Participants	1,141	1,127	(1.23%)
DROP Participants (active)	193	167	(13.47%)
Retired and Disabled Participants	1,391	1,398	0.50%
Surviving Spouses and Children	487	493	1.23%
Total	3,212	3,185	(0.84%)
Total Valuation Compensation[1]	$72,353,122	$71,092,936	(1.74%)
Average Valuation Compensation[2]	52,745	53,745	3.53%
Average Age[2]	38.07	38.76	1.81%
Average Service[2]	10.80	11.38	7.16%
Assets and Liabilities			
EAN Actuarial Liability (AL)	$ 864,762,285	$ 879,906,781	1.75%
Actuarial Value of Assets (AVA)	674,080,072	690,731,190	2.47%
Unfunded Actuarial Liability (UAL)	$ 190,682,213	$ 189,175,591	(0.79%)
Funded Ratio	77.9%	78.5%	
Present Value of Future Benefits (PVB)	957,636,886	968,737,075	1.16%
Present Value of Future Member Contributions	27,867,869	26,652,689	(4.36%)
Summary of Costs			
Total Expected Compensation	$70,325,518	$68,073,148	(3.20%)
Aggregate Normal Cost Rate	43.06%	44.07%	
Aggregate Normal Cost	30,282,168	29,999,836	(0.93%)
Funding Policy Contribution Requirement	32,629,036	32,324,823	(0.93%)

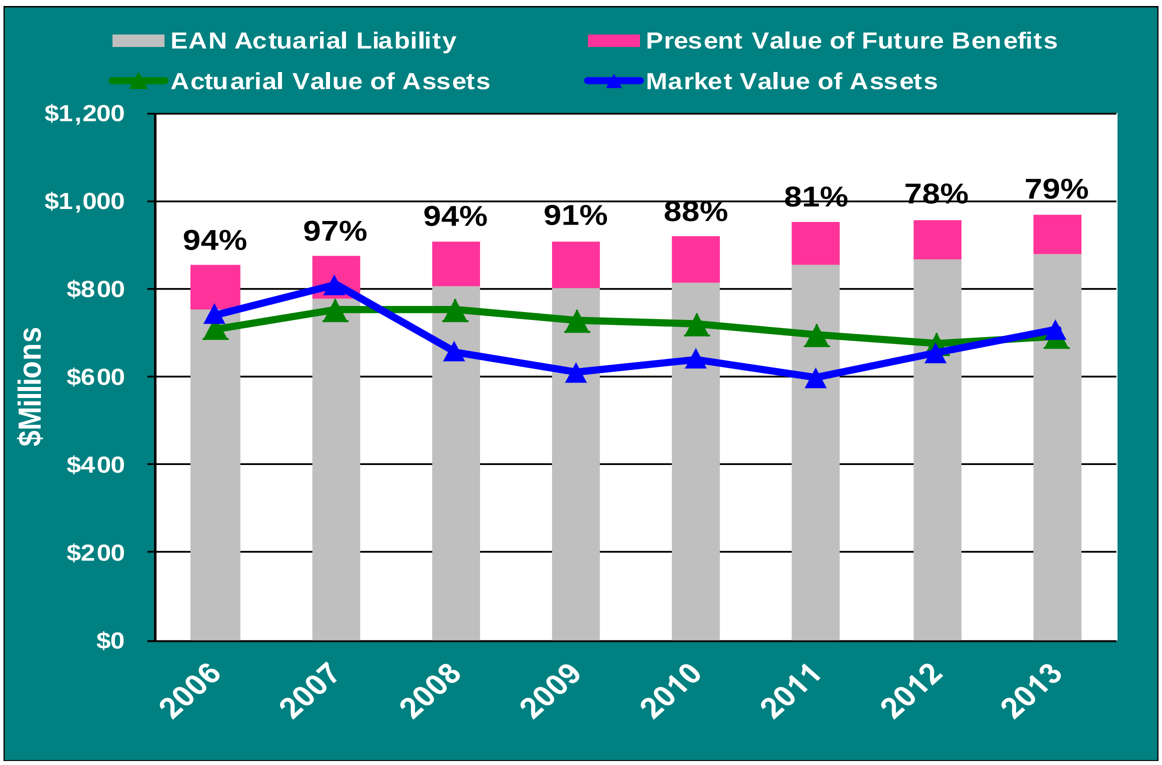
[1] Total Valuation Compensation is the total annual compensation in effect for all employees (including DROP participants) as of the valuation date.
[2] Average Valuation Compensation, Average Age, and Average Service include do not include current DROP participants but do include former DROP participants who have returned to active service.

SECTION I
BOARD SUMMARY

A. Historical Trends

Despite the fact that for most retirement systems the greatest attention is given to the current valuation results and in particular the size of the current unfunded actuarial liability and the employer's contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

Assets and Liabilities



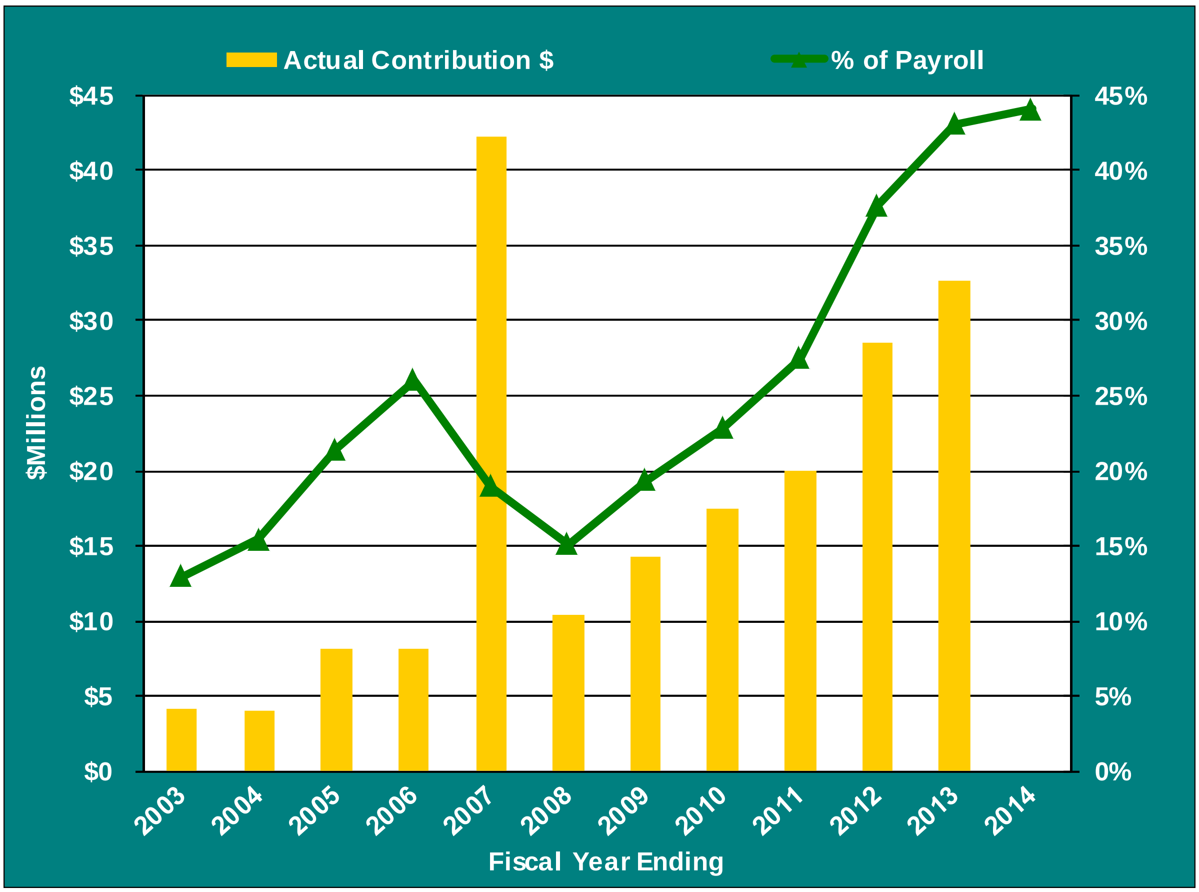
The above chart compares the actuarial value of assets to the actuarial liabilities and shows the funded ratio, which is a comparison of the Actuarial Value of Assets and EAN Actuarial Liability. There was a significant increase in the market value of assets (MVA) from $654 million to $706 million, returning 12.02%. With the asset smoothing method in place, the actuarial value of assets has tracked a slightly smoother path through the volatility of the market value of assets. As can be seen in the graph, the actuarial value of assets (AVA) increased slightly from 2012 to 2013 returning 5.54%. The large market value losses of 2008 and 2009 have now been fully recognized in the AVA.

The top of the pink bar represents the Present Value of Future Benefits (PVFB), which is used in the calculation of the funding policy contribution under the Aggregate Cost Method. From 2007 until 2012 the excess of the PVFB over the AVA had been steadily increasing, thus increasing the calculated contribution amount.

SECTION I
BOARD SUMMARY

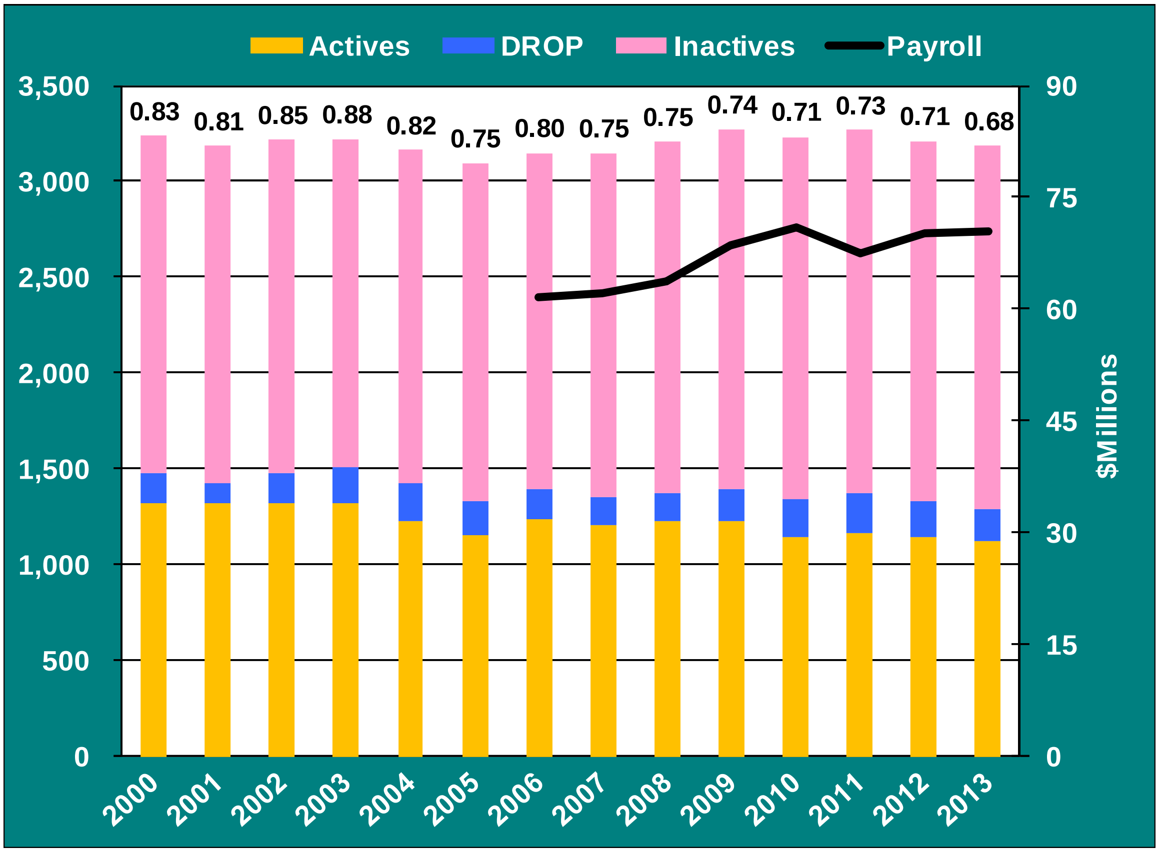
Contribution Rates

The yellow bars in this graph show the dollar amount of contributions made to the System (depicted on the left hand scale) since Fiscal Year Ending 2003. The green line shows the actuarial contribution rate as a percent of payroll (depicted on the right hand scale). The 2007 contribution amount reflects special contributions made by the City in excess of that year's actuarial contribution. The actuarial employer contribution rate increased from 43.06% of payroll in 2012 to 44.07% of payroll in 2013 primarily due to the dollar contribution being expressed as a percentage of a lower payroll amount.



SECTION I
BOARD SUMMARY

Participant Trends



The above chart provides a measure for the maturity in the System, by comparing the ratio of active members (including current DROP participants) to inactive members (retirees and beneficiaries). The active-to-inactive ratio has declined since 2000 from 0.83 actives supporting each inactive member to 0.68 actives supporting each inactive member today, which indicates a more mature plan. The black line represents the total plan payroll since the 2006 valuation and which after steadily increasing through 2010 has leveled off in recent years.

SECTION I
BOARD SUMMARY

B. Future Expected Financial Trends

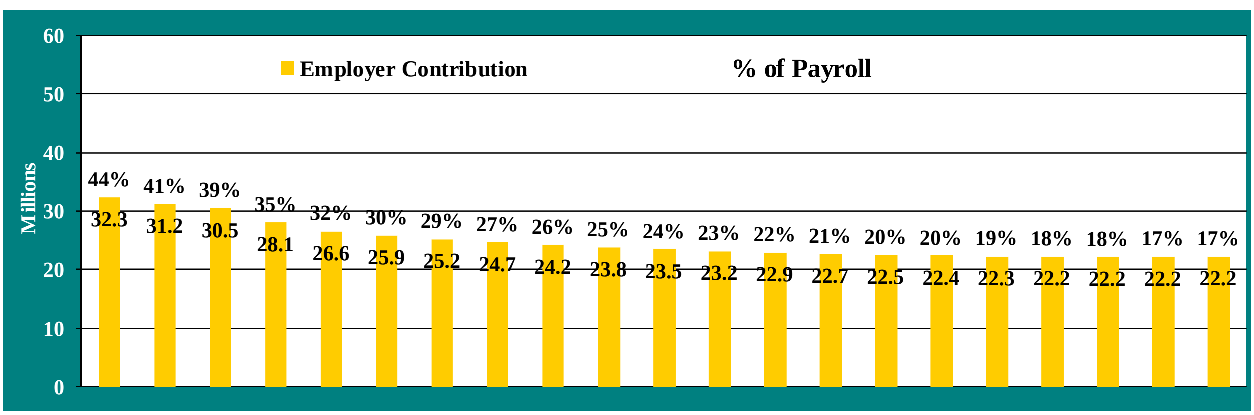
The analysis of projected financial trends is perhaps the most important component of this valuation. In this Section, we present the implications of the October 1, 2013 valuation results in terms of (1) the projected employer contributions, and (2) projected System's funded status (ratio of assets over liabilities). For each projection set, we assume three different future investment return scenarios: Baseline returns of 7.75%, optimistic returns of 9.25%, and pessimistic returns of 6.25%. The projections assume that the liabilities are calculated using a 7.75% liability interest rate and that there will be no future gains or losses on the liability.

1. Contribution Rate Projections

The first set of charts show the employer's projected actuarially determined contribution rates (gold bars). The years shown in the charts are plan years beginning October 1.

Baseline returns of 7.75%

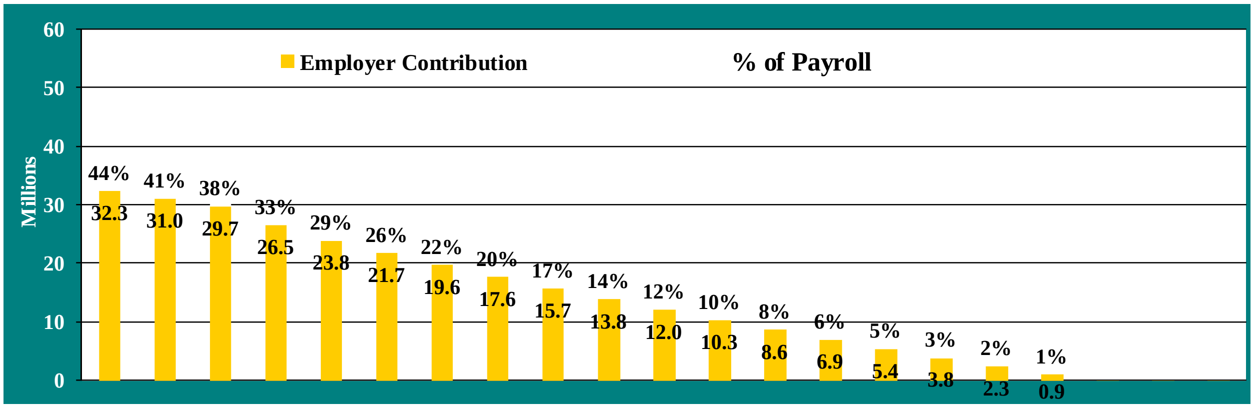
The chart below shows that the actuarially determined contribution rate will slowly decline from 44% to a level of 17% of pay by 2033. These projections assume that the System earns the assumed investment rate of 7.75% on market value. The expected decrease in contribution is due to spreading the unfunded actuarial liability over the present value of future salaries, which has the effect of amortizing the unfunded liability over a relatively short period.



SECTION I
BOARD SUMMARY

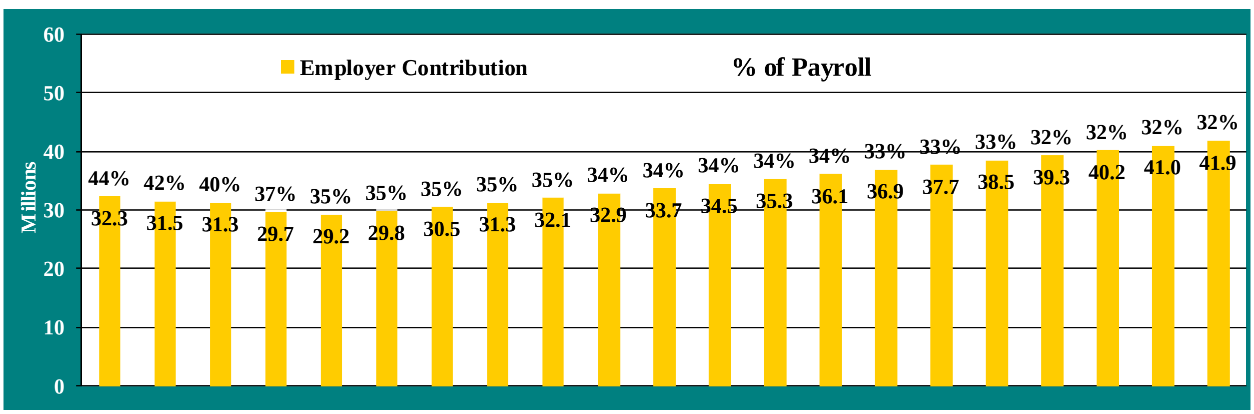
Optimistic returns of 9.25%

If the System earns 1.50% greater than the assumed rate in each year of the projection, the actuarially determined contribution rate will steadily decrease to less than 1% in 20 years.



Pessimistic returns 6.25%

If the System earns 1.50% less than the assumed rate in each year of the projection, the actuarially determined contribution rate decreases slightly for the next 20 years to about 32% of projected payroll as of 2033.



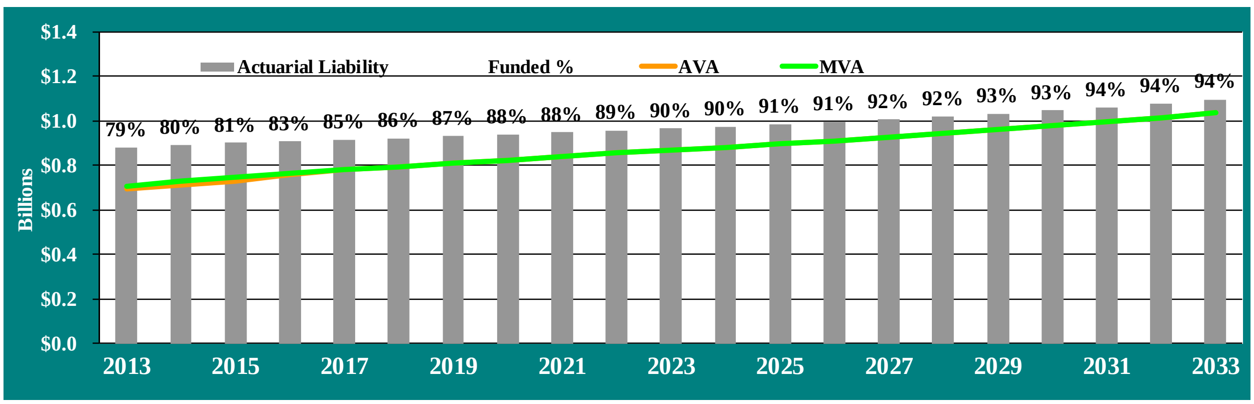
SECTION I
BOARD SUMMARY

2. Asset and Liability Projections

This next set of projection charts compare the market value of assets (green line) and the actuarial or smoothed value of assets (gold line) to the System's EAN actuarial liability (gray bars). In addition, at the top of each chart, we show the System's funded ratio (ratio of actuarial value of assets to actuarial liability). The projections assume that the actuarially determined contributions, as shown in the previous charts, are made each year. The years shown in the chart signify the valuation date as of October 1.

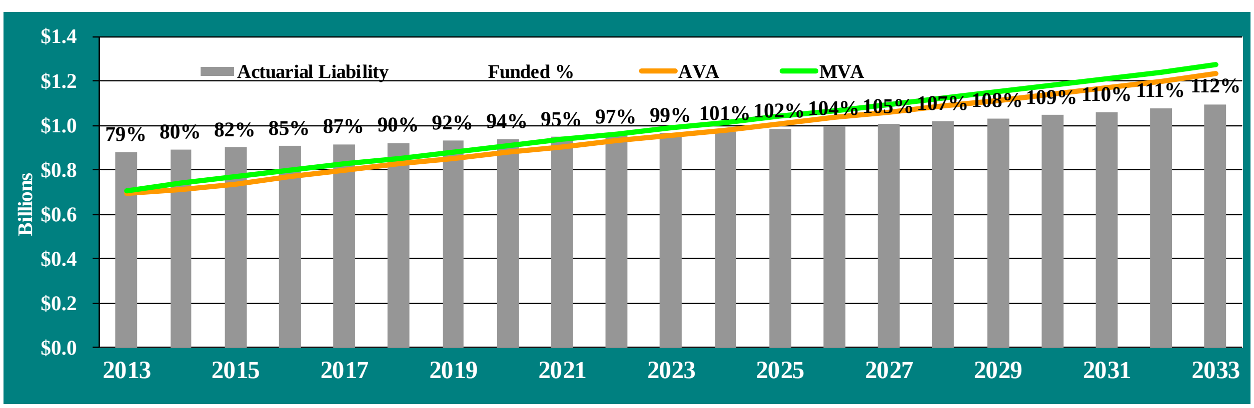
Baseline 7.75% return

Assuming that the System earns the assumed investment rate of 7.75%, the funded ratio will steadily increase from 79% to 94% during the 20-year period.



Optimistic Returns of 9.25%

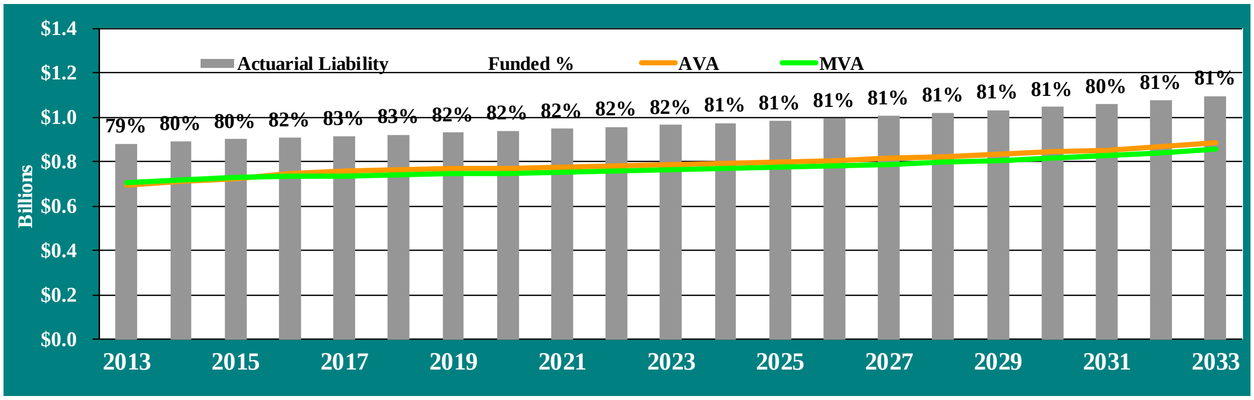
If the System earns 1.50% greater than the assumed rate of return in each year of the projection, the funded ratio will increase to 112% by 2033.



SECTION I
BOARD SUMMARY

Pessimistic Returns of 6.25%

If the System earns 1.50% less than the assumed rate of return in each year of the projection, the funded ratio will remain level at about 80% for the duration of the 20-year period.



SECTION II
ASSETS

Pension Plan assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System's assets including:

- **Disclosure** of the System's assets as of October 1, 2012 and October 1, 2013;
- Statement of the **changes** in market values during the year;
- Development of the **Actuarial Value of Assets**;
- An estimate of **investment return**; and
- A projection of the System's expected **cash flows** for the next ten years.

Disclosure

There are two types of asset values disclosed in this valuation, the market value of assets and the actuarial value of assets. The market value represents a "snap-shot" or "cash-out" value which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for determining relatively stable contribution rates as are the actuarial value of assets which reflect smoothing of annual investment returns.

Table II-1 below discloses and compares each asset value as of September 30, 2012 and 2013.

TABLE II-1
Statement of Assets at Market Value as of September 30,

Assets	**2012**	**2013**	**% Change**
Cash	$ 6,937,121	$ 7,366,765	6.19%
Money market funds	41,748,539	45,625,720	9.29%
Collective equity investment funds	233,220,522	187,426,581	(19.64%)
Corporate stocks	129,322,938	231,887,525	79.31%
Real estate securities fund	28,262,828	26,551,846	(6.05%)
Collective fixed income investment funds	93,844,153	92,714,829	(1.20%)
Corporate bonds	46,067,610	45,401,579	(1.45%)
Government securities	23,533,013	14,599,909	(37.96%)
Mortgage backed securities	14,300,910	16,603,605	16.10%
Hedge fund of funds	25,315,532	28,172,779	11.29%
Partnership interest	5,579,397	5,855,683	4.95%
Short-term notes	4,495,550	3,699,715	(17.70%)
Investment property	1,170,000	1,184,000	1.20%
Receivables	1,682,624	966,217	(42.58%)
Capital assets, net of depreciation	483,827	430,387	(11.05%)
Misc. Liabilities	(2,101,571)	(2,210,472)	5.18%
Market Value of Assets	$ 653,862,993	$ 706,276,668	8.02%

SECTION II
ASSETS

Changes in Market Value

Table II-2 below shows the components of change between the market value of assets as of September 30, 2012 and September 30, 2013.

TABLE II-2
Changes in Market Values

Value of assets --September 30, 2012		**$ 653,862,993**
Additions		
Payments from Members	$ 4,521,571	
Employer Contributions	32,629,036	
Interest and Dividends	13,204,807	
Investment Return	66,950,522	
Total Additions	117,305,936	
Deductions		
Investment Expenses	$ 3,043,081	
Benefit Payments	57,283,047	
Refunds of Employee Contributions	3,566,809	
Administrative Expenses	999,324	
Total Deductions	64,892,261	
Value of assets --September 30, 2013		**$ 706,276,668**

SECTION II
ASSETS

Actuarial Value of Assets

The next table, Table II-3 shows how the actuarial value of assets is developed. The actuarial value of assets method was initialized at market value as of October 1, 2005.

The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce, or eliminate, volatile results which could develop from short-term fluctuations in the market value of assets. For this System, the actuarial value has been calculated by taking the market value of assets less 80% of the investment gain/(loss) during the preceding year, less 60% of the investment gain/(loss) during the second preceding year, less 40% of the investment gain/(loss) during the third preceding year, and less 20% of the investment gain/(loss) in the fourth preceding year. If the actuarial value of assets is less than 80% or more than 120% of the market value, an adjustment is made to the actuarial value to bring the value within this corridor. The table below illustrates the calculation of actuarial value of assets for the October 1, 2013 valuation.

Table II-3
Development of Actuarial Value of Assets

1. Actuarial value of assets at September 30, 2012		$ 674,080,072
2. Employer contributions		32,629,036
3. Payments from members		4,521,571
4. Benefit payments		(60,849,856)
5. Expected return at 7.75%		49,887,882
6. Expected value at September 30, 2013		$ 700,268,705
7. Actual return on assets at September 30, 2013		76,112,924
8. Investment (gain)/ loss [5. – 7.]		$ (26,225,042)
	Total Gain/(Loss)	**Excluded Portion**
Exclude 0% of 2009 gain/(loss)	$ (50,310,222)	$ 0
Exclude 20% of 2010 gain/(loss)	10,886,537	2,177,307
Exclude 40% of 2011 gain/(loss)	(65,407,476)	(26,162,990)
Exclude 60% of 2012 gain/(loss)	30,918,545	18,551,127
Exclude 80% of 2013 gain/(loss)	26,225,042	20,980,034
Total excluded gain/(loss) for AVA calculation		$ 15,545,478
Market value of assets at September 30, 2013		$ 706,276,668
Total gain/(loss) excluded		15,545,478
Actuarial value of assets at September 30, 2013		690,731,190

SECTION II
ASSETS

Investment Performance

The market value of assets (MVA) returned during plan year ending September 30, 2012, which is greater than the assumed 7.75% return. A return of 5.54% was experienced on the actuarial value of assets (AVA), resulting in an actuarial loss for the year. Below we show additional historical returns.

TABLE II-4
Historical Returns

	MVA	AVA
2007	14.70%	12.10%
2008	-14.10%	6.30%
2009	0.80%	4.30%
2010	11.70%	3.50%
2011	-1.87%	2.00%
2012	14.34%	0.13%
2013	12.02%	5.54%

SECTION III
LIABILITIES

In this section, we present detailed information on the System's liabilities including:

- **Disclosure** of the System's liabilities as of October 1, 2012 and October 1, 2013, and
- Statement of **changes** in these liabilities during the year.

Disclosure

Several types of measures of liability are calculated and presented in this report. Each type is distinguished by the purpose for which the measure is used.

- **Present Value of All Future Benefits:** This measure represents the amount of money needed today to fully pay for all benefits of the System both earned as of the valuation date and those expected to be earned in the future by current plan participants, under the current plan provisions if all assumptions are met. This measure of liability is used under the Aggregate Cost Method in the calculation of the required contribution.

- **Entry Age Normal Actuarial Liability:** Calculated as of valuation date as the present value of benefits allocated to service prior to that date. This liability is used for disclosure of the unfunded actuarial liability under GASB Statement No. 25.

Table III-1, which follows, discloses each of these measures of liability for the current and prior valuations.

TABLE III-1
Measures of Liability

	October 1, 2012	October 1, 2013
Present Value of Future Benefits		
Active Participants	$ 255,798,444	$ 251,864,840
DROP and Re-entered Participants	156,099,037	159,857,853
Retired, Disabled, and Beneficiaries	545,739,405	557,014,382
Present Value of Future Benefits (PVB)	**$ 957,636,886**	**$ 968,737,075**
Entry Age Normal Actuarial Liability		
Active Participants	$ 162,923,843	$ 163,034,546
DROP and Re-entered Participants	156,099,037	159,857,853
Retired, Disabled, and Beneficiaries	545,739,405	557,014,382
Entry Age Normal Actuarial Liability (EAN AL)	**$ 864,762,285**	**$ 879,906,781**

SECTION III
LIABILITIES

Changes in Entry Age Normal (EAN) Actuarial Liability

Each of the measures of liability disclosed in the prior table is expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- System amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

The Unfunded EAN actuarial liability will change because of all of the above, and also due to changes in plan assets resulting from:

- Employer contributions
- Investment earnings
- A change in the method used to measure plan assets

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the System. Below, we present key changes in liabilities since the last valuation.

In the table that follows, we show the components of change in the actuarial liability between October 1, 2012 and October 1, 2013.

TABLE III-2

	EAN Actuarial Liability
Liabilities as of October 1, 2012	$ 864,762,285
Liabilities as of October 1, 2013	879,906,781
Liability Increase/(Decrease)	15,144,496
Change Due to:	
Plan Amendments	$ 0
Assumption Changes	0
Experience (Gain)/Loss	(1,552,852)
Benefits Accumulated and Other Sources	16,697,348

SECTION IV
CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed is the **Aggregate Actuarial Cost Method**. This method is known as a spread-gain method. The chief characteristic of a spread-gain method is that the difference between the actuarial value of assets and the present value of total benefit obligations is funded over the future working lifetime of current participants in the form of a continually resetting normal cost.

Table IV-1 below presents and compares the employer contribution rates for the System for this valuation and the prior one.

TABLE IV-1
Employer Contribution Rate

	October 1, 2012	October 1, 2013
1. Present Value of Future Benefits	$ 957,636,886	$ 968,737,075
2. Actuarial Value of Assets (AVA)	674,080,072	690,731,190
3. Present Value of Future Member Contributions	27,867,869	26,652,689
4. Total Assets (2. + 3.)	701,947,941	717,383,879
5. Present Value of Future Normal Contributions (1. – 4.)	255,688,945	251,353,196
6. Present Value of Future Salaries	593,817,708	570,362,374
7. Normal Cost Rate (5. ÷ 6.)	43.06%	44.07%
8. Expected Salaries of Active Participants	$ 70,327,982	$ 68,073,148
9. Normal Cost (7. × 8.)	30,282,168	29,999,836
10. Funding Policy Contribution Requirement	32,629,036	32,324,823

SECTION V
ACCOUNTING STATEMENT INFORMATION

Statement No. 25 of the Governmental Accounting Standards Board (GASB) establishes standards for disclosure of pension information by public employee retirement systems (PERS). GASB Statement No. 27 establishes standards for the accounting and financial reporting of pensions by governmental employers.

The employer contribution amount determined in this valuation meets the parameters of an Annual Required Contribution (ARC) for the employer under GASB 27 for the fiscal year ending June 30, 2014. However, since the plan year runs from October 1 through September 30, the ARC for the plan year ending September 30, 2014 under GASB 25 equals 9/12 of the GASB 27 ARC for the FYE June 30, 2014 plus 3/12 of the GASB 27 ARC for the FYE June 30, 2015.

The GASB 25 actuarial liability is determined using the Entry Age Normal Cost Method assuming that the System is on-going and participants continue to terminate employment, retire, etc., in accordance with the actuarial assumptions. Liabilities are discounted at the assumed valuation interest rate of 7.75% per annum.

GASB Statement No. 25 requires the actuarial liability be compared with the actuarial value of assets for funding purposes. The relevant amounts as of October 1, 2013 are exhibited in Table V-1.

Tables V-2 through V-4 are exhibits to be used with the CAFR report. Table V-2 is a history of gains and losses in actuarial liability, Table V-3 is the Note to Required Supplementary Information, and Table V-4 shows the funding progress of EAN actuarial liability using Actuarial Value of Assets, and Table V-5 shows the funding progress using the Market Value of Assets.

Finally, Table V-6 shows historical GASB Annual Required Contribution (ARC) information, compared to actual contributions and the ARC as a percentage of payroll.

These tables do not reflect the provisions of GASB Statement No. 67 and Statement No. 68 which were approved by GASB in June 2012. Statement No. 67 will be effective for the System for its fiscal year ending September 30, 2014. Statement No. 68 will be effective for the City of St. Louis for its fiscal year ending June 30, 2015. All references and calculations with respect to GASB in this section reflect current Statements No. 25 and 27.

GASB Statements No. 67 and No. 68 will change materially the information shown in financial reports for the System and Employer, The following are some of the more significant changes.

- The System will need to use the Entry Age Normal (EAN) Funding Method for all financial statement disclosures. Certain GASB disclosures are currently based upon the System's actuarial cost method, which is the Aggregate Method. The System will not necessarily need to adopt EAN for employer contribution determination.

SECTION V
ACCOUNTING STATEMENT INFORMATION

- A lower discount rate may apply for purposes of the financial statement disclosures.
- The GASB Annual Required Contribution (ARC) will no longer be a part of the accounting standards.

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-1
Accounting Statement Information
Entry Age Normal Actuarial Liabilities

GASB No. 25 Basis	October 1, 2012	October 1, 2013
1. Active Participants	$ 162,923,843	$ 163,034,546
2. DROP and Re-entered Participants	156,099,037	159,857,853
3. Retired, Disabled, and Beneficiary Participants	545,739,405	557,014,382
4. Total Actuarial Liability (1 + 2)	$ 864,762,285	$ 879,906,781
5. Net Actuarial Assets available for benefits	674,080,072	690,731,190
6. Unfunded Actuarial Liability (3 – 4)	$ 190,682,213	189,175,591

Table V-2
ANALYSIS OF FINANCIAL EXPERIENCE
Gain and Loss in Unfunded Actuarial Liability During Years Ended September 30
Resulting from Differences Between Assumed Experience and Actual Experience

	Gain (or Loss) for Year ending September 30,		
Type of Activity	**2011**	**2012**	**2013**
Investment Income	$ (44,041,753)	$ (47,961,188)	$ (9,537,515)
Combined Liability Experience	(36,550,725)	3,083,770	1,552,852
Gain (or Loss) During Year from Financial Experience	(80,592,478)	(44,877,418)	(7,984,663)
Non-Recurring Gain (or Loss) Items	0	7,172,911	0
Composite Gain (or Loss) During Year	(80,592,478)	(37,704,507)	(7,984,663)

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-3
NOTE TO REQUIRED SUPPLEMENTARY INFORMATION

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	October 1, 2013
Actuarial cost method	Aggregate
Amortization method	N/A
Remaining amortization period for the UAL	N/A
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.75%
Projected salary increases	Varies by age from 3.00% to 6.50%
Cost-of-living adjustments	2.50% per year
Inflation	2.50% per year

The actuarial assumptions used have been based upon recommendations by the actuary and adopted by the System's Board of Trustees.

The actuarial liability is driven in part by the funding method, which is the aggregate method for this Fund. Under the aggregate method the actuarial liabilities are not directly computed but rather set equal to the actuarial value of assets. This makes the actuarial liability as defined under this method inappropriate for tracking the funding level of the Fund. The difference between the total future obligations and the actuarial value of assets is the present value of future normal costs, and this statistic can provide an indication of progress toward funding.

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-4
Schedule of Funding Progress under Entry Age Normal Method - AVA

Valuation Date October 1,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (c)	Funded Ratio (a) / (b)	Covered Payroll[1] (c)	UAAL as a Percent of Covered Payroll [(b) – (a)] / (c)
2006	$709,290,911	$ 754,021,412	$ 44,730,501	94.1%	$ 61,677,786	72.5%
2007	752,501,900	775,668,726	23,166,826	97.0%	62,178,772	37.3%
2008	752,273,226	803,417,002	51,143,776	93.6%	63,834,814	80.1%
2009	727,139,060	799,587,050	72,447,990	90.9%	68,572,905	105.7%
2010	718,136,742	814,926,868	96,790,126	88.1%	71,095,081	136.1%
2011	695,421,570	855,617,994	160,196,424	81.3%	67,593,989	237.0%
2012	674,080,072	864,762,285	190,682,213	77.9%	70,076,650	272.1%
2013	690,731,190	879,906,781	189,175,591	78.5%	70,327,982	269.0%

Table V-5
Schedule of Funding Progress under Entry Age Normal Method – MVA

Valuation Date October 1,	Market Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b) – (a)	Funded Ratio (a) / (b)	Covered Payroll[1] (c)	UAAL as a Percent of Covered Payroll [(b) – (a)] / (c)
2006	$ 741,695,643	$ 754,021,412	$ 12,325,769	98.4%	$ 61,677,786	20.0%
2007	808,886,286	775,668,726	(33,217,560)	104.3%	62,178,772	-53.4%
2008	656,903,659	803,417,002	146,513,343	81.8%	63,834,814	229.5%
2009	608,956,042	799,587,050	190,631,008	76.2%	68,572,905	278.0%
2010	640,405,653	814,926,868	174,521,215	78.6%	71,095,081	245.5%
2011	596,324,758	855,617,994	259,293,236	69.7%	67,593,989	383.6%
2012	653,862,993	864,762,285	210,899,292	75.6%	70,076,650	301.0%
2013	706,276,668	879,906,781	173,630,113	80.3%	70,327,982	246.9%

[1] Covered payroll is the total compensation expected to be paid during the valuation year.

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-6
Schedule of Employer Contributions

Valuation Date October 1,	GASB Statement No. 25 ARC (a)	Contributions Received (b)	Percentage Contributed (b) / (a)	Covered Payroll[1] (c)	ARC as a Percent of Covered Payroll (a) / (c)
2006	$ 15,524,959	$ 8,093,226	52.1%	$ 61,677,786	25.2%
2007	16,136,312	42,289,488	262.1%	62,178,772	26.0%
2008	12,123,143	10,384,025	85.7%	63,834,814	19.0%
2009	11,367,527	14,318,031	126.0%	68,572,905	16.6%
2010	15,107,558	17,476,138	115.7%	71,095,081	21.2%
2011	18,116,333	20,036,918	110.6%	67,593,989	26.8%
2012	22,146,187	28,473,995	128.6%	70,076,650	31.6%
2013	29,512,755	32,629,036	110.6%	70,327,982	42.0%

[1] Covered payroll is the total compensation expected to be paid during the valuation year.

APPENDIX A
MEMBERSHIP INFORMATION

Participant Data Reconciliation

	Actives	DROP	Retirees	Surviving Spouses and Children	Total
Participants as of October 1, 2012	1,141	193	1,391	487	3,212
New Entrants	31				31
Return to Active	3				3
Nonvested terminations	(30)				(30)
Retired	(10)	(27)	37		0
Entered into DROP	(30)	30			0
Re-Entry from DROP	28	(28)			0
Deaths without beneficiary			(14)	(29)	(43)
Deaths with Beneficiary	(2)	(1)	(21)	26	2
Disabled	(4)		4		0
Benefits Expired					0
Data Correction			1	9	10
Net Change	(14)	(26)	7	6	(27)
Participants as of October 1, 2013	1,127	167	1,398	493	3,185

APPENDIX A
MEMBERSHIP INFORMATION

Distribution of Active Participants

	Years of Service								
Age	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 +	Total
Under 20									0
20 – 24	15 39,370								15 39,370
25 – 29	136 42,433	52 46,373							188 43,523
30 – 34	74 43,520	156 48,967	39 56,135						269 48,508
35 – 39	29 47,346	44 49,707	82 57,470	26 59,812					181 54,297
40 – 44	7 43,064	19 50,021	33 55,480	129 61,570	6 63,375				194 58,791
45 – 49		5 51,861	22 55,793	72 60,936	36 63,968	7 61,784			142 60,630
50 – 54		1 53,148	4 55,417	31 61,127	33 63,539	10 70,653			79 62,950
55 – 59	1 43,368	2 52,773	2 56,505	5 61,979	8 62,392	21 71,160	8 68,324		47 66,211
60 – 64				1 55,015	1 56,658	4 65,833	3 76,807	2 71,402	11 68,021
65 +								1 73,480	1 73,480
Total	262 43,129	279 48,766	182 56,565	264 61,155	84 63,520	42 68,969	11 70,637	3 72,095	1,127 53,745

APPENDIX A
MEMBERSHIP INFORMATION

Statistics for Active Participants

		Average		
	Count	Age	Service	Compensation
As of October 1, 2013				
Continuing	1,093	39.1	11.7	$ 54,073
New	34	29.0	1.1	43,226
Total	1,127	38.8	11.4	53,745
As of October 1, 2012				
Continuing	1,108	38.4	11.1	$ 53,163
New	33	27.9	0.8	38,721
Total	1,141	38.1	10.8	52,745

Statistics for DROP Participants

		Average				
	Count	Age	Service	Compensation	DROP Account Balance	Monthly Benefit Amount
As of October 1, 2013	167	49.6	21.5	$ 63,006	$ 87,163	$ 2,383
As of October 1, 2012	193	49.9	21.8	$ 63,061	$ 84,400	$ 2,400

APPENDIX A
MEMBERSHIP INFORMATION

Statistics for Inactive Participants

	Count	Total Monthly Benefits	Average Monthly Benefits
As of October 1, 2013			
Service Retirees	1,245	$ 3,310,005	$ 2,659
Ordinary Disabilities	15	13,162	877
Accidental Disabilities	138	329,150	2,385
Surviving Spouses	438	560,004	1,279
Children	55	32,035	582
Total	1,891	$ 4,244,357	$ 2,245
As of October 1, 2012			
Service Retirees	1,239	$ 3,239,352	$ 2,614
Ordinary Disabilities	15	13,162	877
Accidental Disabilities	137	316,842	2,313
Surviving Spouses	440	545,134	1,239
Children	47	26,669	567
Total	1,878	$ 4,141,159	$ 2,205

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Mortality Rates:

Ordinary: RP-2000 Blue Collar Combined Mortality Table projected to 2018 for males and females; see table of sample rates

Accidental: 0.0003 per year for all ages in addition to ordinary mortality rates

Disabled: RP-2000 Disabled Retiree Mortality tables projected to 2018 for male and female officers.

	Ordinary Mortality (%)		Disabled Mortality (%)	
Age	Male	Female	Male	Female
25	0.0513	0.0178	1.8836	0.5780
35	0.0993	0.0425	2.0624	0.06105
45	0.1417	0.1038	1.7834	0.5573
55	0.2972	0.2420	2.5093	1.4317
65	1.2056	0.9498	3.8928	2.5608
75	3.3464	2.6730	6.3673	4.5199
85	10.1409	7.4569	12.4784	8.9916
95	25.0282	18.5748	25.8023	18.7624
105	39.7886	29.3116	39.7886	29.3116
115	40.0000	40.0000	40.0000	40.0000
125	100.0000	100.0000	100.0000	100.0000

2. Disability:

CCA 1985 Unisex Class 4 table; see table of sample rates

10% of disabilities are assumed ordinary and the remaining 90% are accidental disabilities.

Age	Disability (%)
25	0.0256
35	0.508
45	0.940
55	2.288
60	3.434

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

3. Withdrawal Rates before Retirement:
Service-related rates based on experience; see table of sample rates.

Years of Service	Withdrawal (%)
1-5	5.00
6-10	4.00
11-12	3.00
13-14	2.00
15-18	1.00
19+	0.00

4. DROP and Retirement Rates:

Years of Service	DROP Rate (%)	Retirement Rate (%)
20	50	25
21	25	20
22-27	5	3
28	10	3
29	30	3
30	80	100

Retirement rates are applied to members not electing DROP. All members are assumed to retire by age 65.

5. Marriage

70% of active members are assumed to be married. The male spouse is assumed to be 3 years older than the female.

6. Children

Each member is assumed to have 1.5 children at retirement, disability or death; the child is assumed to be 30 years younger than the member and to receive benefits until he or she is 20 years old.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

7. DROP Participation

Members participate in DROP based on their completed service; see table for rates

- No disability is assumed while in DROP
- One-third of participants are expected to retire from DROP after four years
- The other two-thirds of participants are expected to re-enter the plan after five years in DROP and remain in the plan for two years

8. DROP Re-entry

Participants that have elected to re-enter are assumed to remain active for two years and then retire.

9. Special Advisor and Consultant Benefits

Assumed to be paid to all eligible members.

10. Form of Payment

There are no optional forms of payment; automatic survivor benefits are paid to all members.

11. Net Investment Return

7.75% compounded annually for funding purposes

12. Salary Increases

Wage inflation is assumed to be 3.0%. Individual salaries are expected to increase according to the following table which includes wage inflation and promotion.

Age	Salary Increase (%)
20-24	6.5
25-29	6.0
30-34	5.5
35-39	4.5
40-44	3.5
45+	3.0

13. Cost of Living Adjustments

2.5% per year

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

14. Expenses

Investment return is assumed to be net of investment and administrative expenses of 0.60%.

15. Interest on Member Contributions

4% per year

16. Changes in actuarial assumptions since last actuarial valuation

The assumed interest on member contributions was changed from 6% to 4%. This reflects a change in Board policy from crediting these balances at 6% to crediting them at the 10-Year US Treasury Bill rate plus 1%. This change did not have a material effect on the liability.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Actuarial Value of Assets

The market value of assets less unrecognized returns in each of the last five years, but no earlier than October 1, 2005. Initial unrecognized return is equal to the difference between the actual market return and expected return on the actuarial value of assets, and is recognized over a five-year period. The actuarial value is further adjusted, if necessary, to be within 20% of the market value. The actuarial asset value was initialized at the market value as of October 1, 2005.

2. Actuarial Cost Method

For determining contributions, the cost method used in this valuation is the Aggregate Cost method. Under this method, the difference between the present value of future benefits and the actuarial value of assets is allocated as a level percentage over the future salary of the participants.

There is no actuarial accrued liability with this method. For accounting purposes, the actuarial accrued liability is determined under the entry age normal method.

3. Changes in Actuarial Methods since last valuation

None.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

1. Effective Data and Plan Year

The Plan was established October 1, 1929, under the provisions of what are now Sections 86.010 to 86.193 inclusive, R.S. Mo. 1969. The Alternative Police Retirement System of St. Louis was established October 1, 1957, under the provisions of Sections 86.2000 to 86.366 inclusive, R.S. Mo. 1969.

2. Participation

All persons who become police officers in the City of St. Louis will become members as a condition of their employment.

3. Employer Contributions

The City makes annual contributions which, together with the contributions of the members, are sufficient to provide for the benefits payable by the System.

The City also contributes the amount needed, in addition to the existing assets of the former Police Pension Fund Association and Police Retirement System, to continue the benefits granted by the former system which were in force at the establishment of the new system and to pay certain additional pensions to surviving spouses of members who had belonged to the former systems and who were previously on the pension payroll of the former systems.

4. Participant Contributions

Members contribute at the rate of 7% of their compensation. The Board of Trustees shall annually determine the interest rate to be credited on members' contributions.

5. Service Considered

Creditable Service at retirement shall consist of service rendered by the member as a police officer since last becoming a member, plus any prior service certified on a prior service certificate. No service is included for periods that a member participates in DROP.

6. Compensation Considered

The annual salary which a member earns based on the member's rank or position as defined in the applicable salary matrix, plus additional compensation for academic work and shift differential. Earnable compensation shall not include overtime, standby time, court time, non-uniform time or unused vacation time.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

7. Average Annual Compensation

The average earnable compensation of the member during the member's last two years of creditable service.

8. Normal Retirement Age

Effective August 1, 1979, a member may retire upon completion of 20 years of service, regardless of age, or upon attainment of age 55. Retirement is compulsory at age 65. Upon request of the Board of Police Commissioners, the Board of Trustees may permit a member to defer retirement up to one year at a time.

9. Normal Retirement Benefit (Service Retirement Allowance)

The monthly retirement allowance consists of 2% of the Average Annual Compensation for each year of service up to 25 years, plus 4% of such Average Annual Compensation for each additional year of service up to 5 additional years. Upon completion of at least 30 years of service, the monthly retirement allowance will be 75% of the Average Annual Compensation.

Allowances will be increased up to 3% annually. The annual increase is limited to the lesser of 3% or the increase in the Consumer Price Index City Average (CPI) for all urban consumers for the 12-month period ending in June (four months prior to beginning of the Plan Year). Historical cumulative increases in the CPI in excess of the 3% annual limit maybe added to the current year increase when necessary to bring the current year increase up to the 3% limit. Cumulative increases for retirees and surviving spouses cannot exceed 30%.

10. Disability Benefit

Ordinary Causes
Upon the occurrence of a disability due to causes which are not the result of an accident in the actual performance of duty, a member who has completed ten years of Creditable Service is eligible to receive a retirement allowance.

In the event of ordinary disability before being eligible for service retirement, a member receives a retirement allowance of 90% of his accrued service retirement allowance. The minimum allowance payable is 25% of his Average Annual Compensation. An additional 15% of his Average Annual Compensation is paid for each unmarried dependent child under age 18. If disabled after eligibility for service retirement, the service retirement is still payable.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

Accident in the Actual Performance of Duty
Upon the occurrence of disability due to causes resulting from an accident in the actual performance of duty, regardless of the age or length of service of the member, a member is eligible to receive a retirement allowance equal to 75% of his Average Annual Compensation. At the discretion of the Board of Trustees, if the member is unable to perform any work of any kind, he may receive an annual pension not to exceed his annual compensation at the date of disablement. In addition, an allowance may be granted to cover surgical, medical, and hospital expenses resulting from the accident.

11. Death Benefit

Ordinary Causes Prior to Retirement
Upon the death of a member in service which is not the result of an accident in the actual performance of duty, a benefit is paid to the member's dependents.

The surviving spouse receives an annuity after the member's death of 40% of the Average Annual Compensation of the deceased member plus 15% additional for each unmarried dependent child under age 18. If no surviving spouse, the benefit is shared by the dependent children, but not more than one-half of the surviving spouse's benefit shall be paid for one child. If no surviving spouse or dependent children, accumulated member contributions are returned to the designated beneficiary.

Accident in the Actual Performance of Duty Prior to Retirement
Upon the death of a member as a result of an accident in the actual performance of duty, a benefit is paid to the member's dependents. The surviving spouse receives an annuity after the member's death of 75% of the Average Annual Compensation of the deceased member plus 15% additional for each unmarried dependent child under age 18. If no surviving spouse, the benefit is shared by the dependent children, but not more than one-half of the surviving spouse's benefit shall be paid for one child. If no surviving spouse or dependent child, an amount equal to the surviving spouse's benefit is paid to a dependent father or mother of a deceased member until remarriage or death.

Death Benefit after Retirement
Upon the death of a member retired from service, ordinary disability or accidental disability, the surviving spouse receives an annuity after the member's death of 40% of the deceased member's Average Annual Compensation plus an additional 15% for each unmarried dependent child under age 18. If there is no surviving spouse, the entire death benefit is shared by the dependent children, but one child may not be paid more than one-half of the surviving spouse's benefit. The surviving spouse of a service retiree will receive an increase of up to 3% annually, subject to the same conditions as the increases to service retirees.

If a member, retired because of the accidental disability, dies before receiving benefits for five years, the surviving spouse receives an additional pension of 10% of the deceased member's Average Annual Compensation.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

12. Disabled Child Over Age 18

Whenever benefits are provided for an unmarried dependent child under age 18, such child who was disabled prior to age 18 will receive benefits after age 18 as long as disabled and not confined to a public institution.

13. Student Benefits Ages 18 to 22

Whenever benefits are provided for an unmarried dependent child under age 18, such child may receive benefits through age 22 as long as he or she remains a full-time student.

14. Special Consultant Benefits

Any retiree or any surviving spouse of a retiree or active member whose benefit is less than $650 per month upon application will be employed by the Board of Trustees and paid a consultant's benefit such that his or her total benefit will equal $650.

15. Special Advisor Benefits

Any retiree or any surviving spouse who is older than age 60 can become a special advisor and be eligible for an additional benefit equal to $10 per month for each full year over age 60.

16. Return of Contributions

Upon service retirement or death while active or disability due to an accident in the actual performance of duty or ordinary disability, contributions without interest are refunded. Upon the withdrawal from service of a member prior to retirement, the entire amount of the member's contributions with interest accumulation is returned to the member. If, at the termination of all benefits with respect to a member, the total of all benefit payments to date is less than the member's accumulated contributions at retirement or prior to death, the difference is paid to his or her beneficiary, or if no such beneficiary is living, to the estate of the beneficiary last entitled to benefits. Upon death, member contributions are returned to the surviving spouse of the member who died prior to receiving a refund of their contributions.

17. Form of Payment

There are no optional forms of payment; automatic survivor benefits are paid to all members.

18. Deferred Retirement Option Plan (DROP)

Any member who has at least twenty years of service or has attained the age of 55 may elect to participate in the DROP. A member electing to participate in the DROP will continue in active employment and will not receive any direct retirement allowance payments during

APPENDIX C
SUMMARY OF PLAN PROVISIONS

participation in the DROP. No one may participate in the DROP for a period exceeding five years.

Upon the start of the participation in the DROP, the member's contributions will cease. During the period of participation in the DROP, the amount that the member would have received as a service retirement allowance, if the member had retired, is deposited monthly in the member's DROP account. A member's DROP account earns interest equal to the rate of return earned by the System's investment portfolio (net of investment expenses) during the prior plan year on a market value basis, beginning in the first plan year after the member begins DROP participation. The DROP account is paid in a lump sum or a series of 120 monthly installments when a member retires.

The member's service retirement allowance is not adjusted for any cost-of-living increases for any period prior to the member's retirement. Service earned during the period of participation in DROP is not creditable service and is not counted in the determination of any service retirement allowance or surviving spouse's or dependents' benefits. A member who has elected to participate in DROP may re-enter the System.

Upon re-entry, a member is no longer eligible to participate in the DROP and will be required to make contributions of 7% of compensation. If the member remains active for at least two years following re-entry and retires, or if the member terminates due to death or disability at any time following re-entry, the member's benefit upon retirement will be based on creditable service and Plan provisions in effect at retirement. If the member terminates other than due to death or disability within two years following re-entry, the member's benefit upon retirement will be equal to the member's benefit at the time of entry into DROP plus any benefit accruals since re-entry. Additional benefit accruals will be based on the member's Average Annual Compensation earned while in DROP and Plan provisions in effect at retirement.

The member's contributions without interest will be paid to the member upon retirement or to the member's surviving spouse if the member dies before retirement.

19. Changes Since Last Valuation

None.