

Firemen's Retirement System of St. Louis

GASB Statement Nos. 67 and 68 Plan Reporting and
Accounting Schedules as of October 1, 2021





February 3, 2022

Mr. John D. Brewer
Executive Director
The Firemen's Retirement System of St. Louis
1601 South Broadway
St. Louis, Missouri 63104

Dear Mr. Brewer:

This report provides information required by the Firemen's Retirement System of St. Louis ("FRS") in connection with the Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 "Financial Reporting for Pension Plans."

Our actuarial calculations for this report were prepared for the purpose of complying with the requirements of GASB Statements No. 67 and 68. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB Statements No. 67 and 68. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statements No. 67 and 68 may produce significantly different results. This report may be provided to parties other than the Firemen's Retirement System of St. Louis ("FRS") only in its entirety and only with the permission of FRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by FRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data.

This report is also based on discussions with the City's auditor concerning the application of the entry age normal method for closed plans with frozen accrued benefits. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report that was provided to FRS and should be considered in conjunction with that report. Please see the actuarial valuation report as of

October 1, 2021, for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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The actuarial valuation as of October 1, 2021, uses actuarial assumptions based on an experience review for the period from October 1, 2014, through September 30, 2018.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the Firemen's Retirement System of St. Louis as it applies to GASB Statements No. 67 and 68. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled. We are relying on the GRS actuaries and Internal Software, Training, and Processes Team who developed and maintain the model.

This report reflects the impact of COVID-19 through September 30, 2021. However, this report does not reflect the longer term and still developing future impact of COVID-19, which is likely to further influence demographic experience and economic expectations. We will continue to monitor these developments and their impact on the Fund and the actuarial assumptions. Actual experience will be reflected in each subsequent annual valuation, as experience emerges.

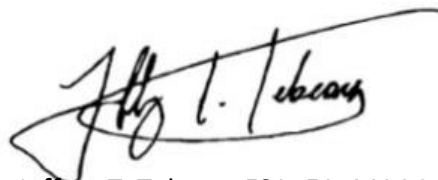
The signing actuaries are independent of the plan sponsor.

Alex Rivera and Jeffrey T. Tebeau are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,
Gabriel, Roeder, Smith & Company



Alex Rivera, FSA, EA, MAAA, FCA
Senior Consultant



Jeffrey T. Tebeau, FSA, EA, MAAA, FCA
Consultant



Auditor's Note – This information is presented in draft form for review by the Plan's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the Plan's financial statements.



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SECTION A



EXECUTIVE SUMMARY

Executive Summary as of October 1, 2021

	2021
Actuarial Valuation Date	October 1, 2021
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)	October 1, 2021

Membership

Number of	
- Retirees and Beneficiaries	842
- Active DROP Members	96
- Active Non-DROP Members	359
- Total	1,297
Covered Payroll ¹	\$ 25,470,902

Net Pension Liability

Total Pension Liability	\$ 470,255,361
Plan Fiduciary Net Position ²	492,554,234
Net Pension Liability	\$ (22,298,873)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	104.74%
Net Pension Liability as a Percentage of Covered Payroll	-87.55%

Development of the Single Discount Rate

Single Discount Rate Beginning of Year	7.000%
Single Discount Rate End of Year	7.000%
Long-Term Expected Rate of Return	7.000%
Long-Term Municipal Bond Rate Beginning of Year ³	2.41%
Long-Term Municipal Bond Rate End of Year ³	2.19%
Year Plan is projected to be fully funded	2021

GASB No. 68 Pension Expense	\$ (29,431)
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Deferred Outflows and Deferred Inflows of Resources to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred (Inflows) of Resources
Difference between expected and actual non-investment experience	\$ -	\$ (804,879)
Changes in assumptions	1,014,501	-
Difference between expected and actual investment earnings	18,708,336	(47,198,309)
Total	\$ 19,722,837	\$ (48,003,188)

¹ Excludes payroll for current DROP members.

² Excludes Future Benefit Fund restricted for SHARE program benefits.

³ Source: The rates at the beginning and end of the year are based on the fixed-income municipal bonds with 20 years to maturity that included only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index." In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities.

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain additional required information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state or local governments to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the liability and investment experience.

Pension plans that prepare their own, stand-alone financial statements, are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The *statement of fiduciary net position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *statement of changes in fiduciary net position* presents additions, such as contributions and investment income, and deductions, such as benefit payments and expenses and net increase or decrease in the fiduciary net position.

Discussion

Notes to Financial Statements

GASB Statement No. 68 requires, in the notes of the employer's financial statements, a disclosure of the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

Both GASB Statements, No. 67 and 68, require the notes of the financial statements for the employers and pension plans, to include certain additional information. The list of additional disclosure items should include:

- A description of benefits provided by the plan;
- The type of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with Statement No. 67. This information includes:

- The composition of the pension plan's board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

Discussion

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability and the net pension liability as a percent of covered-employee payroll;
- Comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy; and
- The annual money-weighted rate of return on pension plan investments for each year.

These tables may be built prospectively as the information becomes available.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In traditional actuarial terms, this will be the accrued liability less the market value of assets.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least once every two years. If the actuarial valuation is not calculated as of the plan's fiscal year end, the total pension liability is required to be rolled forward from the actuarial valuation date to the pension plan's fiscal year end.

The total pension liability shown in this report is based on an actuarial valuation performed as of October 1, 2021, and a measurement date of October 1, 2021.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be available and sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year mixed maturity, general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

The long-term expected rate of return for the FRS funding is assumed to be 6.750%. Per Statute, this rate is net of both investment and administrative expenses. GASB Statements No. 67 and 68 require the long-term expected rate of return to be determined net of pension plan investment expense but without reduction for pension plan administrative expense. Administrative expenses are assumed to be approximately 25 basis points; consequently, the long-term expected rate of return used for purposes of GASB Statements No. 67 and 68 is increased by 25 basis points to 7.000%. This rate is gross of administrative expenses.

Discussion

For the purpose of this actuarial valuation, the expected rate of return on pension plan investments is 7.000%, the municipal bond rate is 2.190% (based on the most recent daily rate available on or before the measurement date of the Fidelity “20-Year Municipal GO AA Index”), and the resulting single discount rate is 7.000%.

The single discount rate is the same as the expected rate of return on pension plan assets because FRS is closed to new members, benefits are frozen as of February 1, 2013, and based on the net pension liability as of October 1, 2021, FRS is fully funded. Our projection assumes the City will make contributions as required by statute.

Effective Date and Transition

GASB Statement No. 67 is effective for a pension plan’s fiscal years beginning after June 15, 2013, and GASB Statement No. 68 is effective for a pension plan’s fiscal years beginning after June 15, 2014; however, earlier application is encouraged by the GASB.

SECTION B

FINANCIAL STATEMENTS

Auditor's Note – This information is subject to review by the System's auditor. Please let us know if the System's auditor recommends any changes.

Statement of Fiduciary Net Position

As of October 1, 2021

	2021
Assets	
Investments	
Fixed income	\$ 114,316,385
Equities	219,516,926
Hedge funds	76,917,811
Real estate	77,547,191
Limited partnership units	-
Money market funds	5,803,067
Total Investments	\$ 494,101,380
Cash and Deposits	\$ 3,702,219
Receivables	
Interest and dividends	\$ 250,939
Unsettled investment transactions	-
Other receivables	354,873
Employer contributions	-
Total Receivables	\$ 605,812
Capital Assets, less Accumulated Depreciation	\$ 240,944
Total Assets	\$ 498,650,355
Deferred Outflows of Resources	
Systems' staff pension related	\$ 157,590
Liabilities	
Payables	
Unsettled investment transactions	\$ -
Accrued investment management fees	295,440
Net pension liability - Systems' staff pension related	383,162
Members contributions refundable	24,528
Accrued Benefits Payable	328,607
Accrued administrative expenses	100,348
Due to The Firefighters' Retirement Plan of the City of St. Louis	-
Total Liabilities	\$ 1,132,085
Deferred Inflows of Resources	
Systems' staff pension related	\$ -
Net Position	\$ 497,675,860
Future Benefit Fund Restricted for SHARE Program	\$ 5,121,626
Net Position Restricted for Pensions	\$ 492,554,234



Statement of Changes in Fiduciary Net Position

As of October 1, 2021

	2021
Additions	
Contributions	
Employer	\$ 3,403,198
Employee	-
Other	-
Total Contributions	\$ 3,403,198
Investment Income	
Net Appreciation in Fair Value of Investments	\$ 86,122,600
Dividends	2,723,895
Interest	1,948,923
Class Action Lawsuit Proceeds	26,775
Securities Lending Income	54,925
Less Investment Expense	(1,586,198)
Net Investment Income	\$ 89,290,920
Other	\$ -
Total Additions	\$ 92,694,118
 Deductions	
Benefit Payments	31,866,438
Benefit Payments SHARE Program	145,270
Refunds of Employee Contributions	1,398,931
Pension Plan Administrative Expense	1,099,845
Other	-
Total Deductions	\$ 34,510,484
Net Increase in Net Position	\$ 58,183,634
Transfer Out Due to Settlement Agreement	\$ -
 Net Position	
Beginning of Year	\$ 439,492,226
End of Year	\$ 497,675,860
Future Benefit Fund Restricted for SHARE Program	\$ 5,121,626
Net Position Restricted for Pensions	\$ 492,554,234



SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note – This information is subject to review by the System's auditor. Please let us know if the System's auditor recommends any changes.

Schedules of Required Supplementary

Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Fiscal year ending October 1,	2021	2020	2019	2018	2017	2016	2015	2014 - Restated	2014
Total Pension Liability									
Service Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,917,882
Interest on the Total Pension Liability	31,900,271	32,070,852	32,252,813	32,729,886	34,536,458	34,916,115	34,403,495	34,449,637	35,325,590
Benefit Changes	-	-	-	-	-	-	-	-	-
Difference between Expected and Actual Experience	(730,385)	(721,053)	(1,287,244)	(5,442,030)	(26,462,974)	(6,984,303)	15,441	-	-
Assumption Changes	-	-	19,942,113	-	-	-	43,915,338	-	-
Benefit Payments	(31,866,438)	(32,908,833)	(32,808,908)	(32,161,027)	(32,015,540)	(32,154,888)	(33,561,947)	(34,001,921)	(34,001,921)
Refunds	(1,398,931)	(1,399,122)	(2,027,172)	(649,093)	(816,435)	(1,278,330)	(1,294,477)	(1,205,393)	(1,205,393)
Net Change in Total Pension Liability	(2,095,483)	(2,958,156)	16,071,602	(5,522,264)	(24,758,491)	(5,501,406)	43,477,850	(757,677)	4,036,158
Total Pension Liability - Beginning	472,350,844	475,309,000	459,237,398	464,759,662	489,518,153	495,019,559	451,541,709	452,299,386	461,095,233
Total Pension Liability - Ending (a)	\$ 470,255,361	\$ 472,350,844	\$ 475,309,000	\$ 459,237,398	\$ 464,759,662	\$ 489,518,153	\$ 495,019,559	\$ 451,541,709	\$ 465,131,391
Plan Fiduciary Net Position									
Employer Contributions	\$ 3,403,198	\$ 1,297,238	\$ -	\$ 2,715,141	\$ 3,313,603	\$ 2,715,140	\$ -	\$ 1,007,760	\$ 1,007,760
Employee Contributions	-	-	-	-	-	-	-	-	-
Pension Plan Net Investment Income	88,368,706	19,147,399	8,307,594	24,519,983	60,390,472	38,228,538	(10,931,763)	48,269,780	48,269,780
Benefit Payments	(31,866,438)	(32,908,833)	(32,808,908)	(32,161,027)	(32,015,540)	(32,154,888)	(33,561,947)	(34,001,921)	(34,001,921)
Refunds	(1,398,931)	(1,399,122)	(2,027,172)	(649,093)	(816,435)	(1,278,330)	(1,294,477)	(1,205,393)	(1,205,393)
Pension Plan Administrative Expense	(1,099,845)	(1,086,499)	(1,027,225)	(1,050,387)	(1,067,626)	(1,095,335)	(1,593,979)	(1,424,217)	(1,424,217)
Transfer (Out)/In Due to Settlement Agreement	166,792	166,792	166,792	166,792	166,792	166,792	-	(10,278,591)	(10,278,591)
Net Change in Plan Fiduciary Net Position	57,573,482	(14,783,025)	(27,388,919)	(6,458,591)	29,971,266	6,581,917	(47,382,166)	2,367,418	2,367,418
Plan Fiduciary Net Position - Beginning ^a	434,980,752	449,763,777	477,152,696	483,611,287	453,640,021	447,058,104	494,440,270	492,221,578	492,221,578
Plan Fiduciary Net Position - Ending (b)	\$ 492,554,234	\$ 434,980,752	\$ 449,763,777	\$ 477,152,696	\$ 483,611,287	\$ 453,640,021	\$ 447,058,104	\$ 494,588,996	\$ 494,588,996
Net Pension Liability - Ending (a) - (b)	(22,298,873)	37,370,092	25,545,223	(17,915,298)	(18,851,625)	35,878,132	47,961,455	(43,047,287)	(29,457,605)
Plan Fiduciary Net Position as a Percentage									
of Total Pension Liability	104.74 %	92.09 %	94.63 %	103.90 %	104.06 %	92.67 %	90.31 %	109.53 %	106.33 %
Covered Employee Payroll	\$ 25,470,902	\$ 28,364,942	\$ 28,991,522	\$ 29,796,947	\$ 31,079,373	\$ 30,219,253	\$ 30,288,086	\$ 29,767,542	\$ 29,767,542
Net Pension Liability as a Percentage									
of Covered Employee Payroll	(87.55)%	131.75 %	88.11 %	(60.12)%	(60.66)%	118.73 %	158.35 %	(144.61)%	(98.96)%
Notes to Schedule:									

^a Reflects a net pension liability adjustment for the Systems' staff pension plan of \$148,726 excluded from the market value of assets as of September 30, 2014, and provided for the actuarial valuation as of October 1, 2014.

Ten fiscal years will be built prospectively.



Schedules of Required Supplementary Information

Schedule of the Net Pension Liability Multiyear

FY Ending October 1,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2014	\$ 465,131,391	\$ 494,588,996	\$ (29,457,605)	106.33%	\$ 29,767,542	(98.96)%
2014 - Restated	451,541,709	494,588,996	(43,047,287)	109.53%	29,767,542	(144.61)%
2015	495,019,559	447,058,104	47,961,455	90.31%	30,288,086	158.35 %
2016	489,518,153	453,640,021	35,878,132	92.67%	30,219,253	118.73 %
2017	464,759,662	483,611,287	(18,851,625)	104.06%	31,079,373	(60.66)%
2018	459,237,398	477,152,696	(17,915,298)	103.90%	29,796,947	(60.12)%
2019	475,309,000	449,763,777	25,545,223	94.63%	28,991,522	88.11 %
2020	472,350,844	434,980,752	37,370,092	92.09%	28,364,942	131.75 %
2021	470,255,361	492,554,234	(22,298,873)	104.74%	25,470,902	(87.55)%

Ten fiscal years will be built prospectively.

Schedules of Contributions Multiyear Last Ten Fiscal Years

FY Ending October 1,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2014	\$ 1,007,760	\$ 1,007,760	\$ -	\$ 29,767,542	3.39%
2015	-	-	-	30,288,086	0.00%
2016	2,715,140	2,715,140	-	30,219,253	8.98%
2017	3,313,603	3,313,603	-	31,079,373	10.66%
2018	2,715,141	2,715,141	-	29,796,947	9.11%
2019	-	-	-	28,991,522	0.00%
2020	1,297,238	1,297,238	-	28,364,942	4.57%
2021	3,403,198	3,403,198	-	25,470,902	13.36%

Ten fiscal years will be built prospectively.

Notes to Schedule of Contributions

Valuation Date: October 1, 2021

Notes Actuarially determined contribution rates are calculated as of October 1, which corresponds to the beginning of the plan year in which contributions will be made.

Methods and Assumptions Used to Determine Contributions:

Actuarial Cost Method	Entry Age - Frozen Initial Liability (FIL)
Amortization Method	30-year closed period from establishment
Remaining Amortization Period	Various
Asset Valuation Method	3-year smoothed market
Inflation	2.50%
Salary Increases ^a	2.75% to 3.75% based on service. FRS benefits were frozen as of February 1, 2013; therefore, no salary increases have been assumed in FRS for purposes of determining benefits.
Investment Rate of Return	6.75%, net of investment and administrative expenses
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition.
Mortality	The post-retirement ordinary mortality rates are based on the Pub-2010 Public Safety Healthy Annuitant mortality table, sex distinct. The pre-retirement mortality rates are based on the Pub-2010 Public Safety Employee mortality tables, sex distinct. The post-disability mortality rates are based on the Pub-2010 Public Safety Disabled Retiree mortality table, sex distinct. Future mortality improvements are reflected by projecting the base mortality tables forward from the year 2010 using the MP-2019 projection scale.

Other Information:

Notes Actuarial valuation as of October 1, 2021, uses actuarial assumptions based on an experience review for the period from October 1, 2014, through September 30, 2018.

Methods and Assumptions Used for Accounting Purposes as of the Valuation Date:

Actuarial Cost Method	Entry Age Normal, assumes all benefits are fully accrued as of the freeze date of February 1, 2013.
Discount Rate	7.00% as of the October 1, 2020, actuarial valuation. 7.00% as of the October 1, 2021, actuarial valuation.

^a The present value of future salaries is used to develop the normal cost under the FIL cost method.



Schedule of Investment Returns Multiyear Last Ten Fiscal Years

<u>FY Ending October 1,</u>	<u>Annual Return¹</u>
2013	14.41 %
2014	10.32 %
2015	(2.42)%
2016	9.20 %
2017	14.69 %
2018	5.82 %
2019	1.80 %
2020	4.69 %
2021	22.42 %

¹ Annual money-weighted rate of return, net of investment expenses.

Calculated by FRS. Ten fiscal years will be built prospectively.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Auditor's Note – This information is subject to review by the System's auditor. Please let us know if the System's auditor recommends any changes.

Long-Term Expected Return on Plan Assets and Asset Allocation

Long-Term Expected Return on Plan Assets

The assumed rate of investment return was adopted by the plan's trustees after considering input from the plan's investment consultant(s) and actuary(s). Additional information about the assumed rate of investment return is included in our actuarial valuation report as of October 1, 2021. The assumed rate of investment return was most recently analyzed in the experience review for the period October 1, 2014, through September 30, 2018.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which expected future real rates of return (expected returns, net of pension plan investment expense, and inflation) are developed for each major asset class. These real rates of return are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. For each major asset class that is included in the pension system's target asset allocation as of October 1, 2021, these best estimates are summarized in the following table:

Asset Allocation

<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>
Core Bonds	5.00%	2.58%
Core Plus	22.00%	2.88%
Absolute Return	3.00%	4.25%
US Large Cap Equity	18.00%	7.13%
US Small Cap Equity	8.00%	8.53%
International Developed Equity	17.00%	7.99%
Emerging Market Equity	5.00%	9.23%
Long/Short Equity	7.00%	5.68%
Core Real Estate	10.00%	6.60%
Value Add Real Estate	5.00%	8.10%
Total	100.00%	

The above long-term expected real rates of return represent best estimates of arithmetic rates of return for each major asset class included. These rates of return are shown net of inflation and net of investment expenses.

Target asset allocation and long-term expected real rates of return provided by the System's investment consultant, Asset Consulting Group.



Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Single Discount Rate

A single discount rate of 7.000% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.000%. The projection of cash flows used to determine this single discount rate assumed that the plan sponsor would make the required contributions as defined by Statute. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the plan's net pension liability, calculated using a single discount rate of 7.000%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is one percentage-point lower or one percentage-point higher:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

	1% Decrease 6.000%	Current Single Discount Rate Assumption 7.000%	1% Increase 8.000%
Total Pension Liability (TPL)	\$512,178,791	\$470,255,361	\$434,539,791
Net Position Restricted for Pensions	\$492,554,234	\$492,554,234	\$492,554,234
Net Pension Liability (NPL)	\$19,624,557	(\$22,298,873)	(\$58,014,443)

Summary of DROP Accounts as of the Actuarial Valuation Date

A member eligible for service retirement may defer receipt of the service retirement benefit for up to five years while continuing active employment. The amount the member would have received as a service retirement benefit is deposited into the DROP account. A member terminating the DROP plan may retire or continue active service. Service while in the DROP will not count as creditable service. Upon termination of employment, the member may choose to receive the DROP account with the interest earned by the account.

	Active Members				Non-Active Members		Total Members	
	In DROP		Previously in DROP		Previously in DROP		with DROP Balance	
	Count	DROP Balance	Count	DROP Balance	Count	DROP Balance	Count	DROP Balance
2017	59	\$ 3,816,955	59	\$ 11,619,376	96	\$ 17,810,165	214	\$ 33,246,496
2018	65	4,849,794	62	12,503,202	92	17,954,353	219	35,307,349
2019	76	5,206,955	55	11,540,173	107	20,498,486	238	37,245,614
2020	79	5,709,756	59	12,301,904	110	21,212,077	248	39,223,737
2021	96	7,235,307	53	11,911,601	120	23,995,164	269	43,142,072

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	842
Active Plan Members Currently in the DROP	96
Active Plan Members	<u>359</u>
Total Plan Members	1,297

Additional information about the member data used can be found in the October 1, 2021, funding actuarial valuation report.

SECTION E

GASB STATEMENT NO. 68 PENSION EXPENSE

Net Pension Liability for Fiscal Year Ending October 1, 2021

A. Total pension liability	
1. Service Cost	\$ -
2. Interest on the Total Pension Liability	31,900,271
3. Changes of benefit terms	-
4. Difference between expected and actual experience	(730,385)
5. Changes of assumptions	-
6. Benefit payments	(31,866,438)
7. Refunds of employee contributions	(1,398,931)
8. Net change in total pension liability	\$ (2,095,483)
9. Total Pension liability - beginning (October 1, 2020)	472,350,844
10. Total Pension liability - ending (October 1, 2021)	\$ 470,255,361
B. Plan fiduciary net position	
1. Contributions – employer	\$ 3,403,198
2. Contributions – employee	-
3. Net investment income	88,368,706
4. Benefit payments, including refunds of employee contributions	(33,265,369)
5. Pension Plan Administrative Expense	(1,099,845)
6. Transfer (Out)/In Due to Settlement Agreement	166,792
7. Net change in plan fiduciary net position	\$ 57,573,482
8. Plan fiduciary net position - beginning (October 1, 2020)	434,980,752
9. Plan fiduciary net position - ending (October 1, 2021)	\$ 492,554,234
C. Net pension liability as of October 1, 2021	\$ (22,298,873)
D. Plan fiduciary net position as a percentage of the total pension liability	104.74%
E. Covered-employee payroll	\$ 25,470,902
F. Net pension liability as a percentage of covered employee payroll	(87.55)%

Pension Expense for Fiscal Year Ending October 1, 2021

A. Expense

1. Service Cost	\$	-
2. Interest on the Total Pension Liability		31,900,271
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)		-
5. Projected Earnings on Plan Investments (made negative for addition here)		(29,370,820)
6. Pension Plan Administrative Expense		1,099,845
7. Other Changes - Transfer Due to Settlement Agreement		(166,792)
8. Recognition of Outflow (Inflow) due to Liability Experience		(1,529,162)
9. Recognition of Outflow (Inflow) due to Assumption Changes		6,309,204
10. Recognition of Outflow (Inflow) due to Investment Experience		(8,271,977)
11. Total Pension Expense	\$	(29,431)

B. Reconciliation of Net Pension Liability

1. Net Pension Liability beginning of year	\$	37,370,092
2. Pension Expense		(29,431)
3. Employer Contributions		(3,403,198)
4. Change in Deferred Liability Experience (Inflows)/Outflows		798,777
5. Change in Deferred Assumption Changes (Inflows)/Outflows		(6,309,204)
6. Change in Deferred Investment Experience (Inflows)/Outflows		(50,725,909)
7. Net Pension Liability end of year	\$	(22,298,873)

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods for Fiscal Year ending October 1, 2021

A. Outflows and (Inflows) of Resources Recognized in Current and Future Pension Expenses as of Fiscal Year End October 1, 2021

Experience (Gain)/Loss	Original Balance	Date Established	Original Recognition Period/ Amortization Factor	Amount Recognized in Past Pension Expenses	Amount Recognized in Current Pension Expense	Deferred (Inflows) to be Recognized in Future Pension Expenses	Deferred Outflows to be Recognized in Future Pension Expenses
1. Differences between Expected and Actual Non-Investment Experience	\$ (730,385)	October 1, 2021	2.8871	\$ -	\$ (252,982)	\$ (477,403)	\$ -
	(721,053)	October 1, 2020	3.1414	(229,531)	(229,531)	(261,991)	-
	(1,287,244)	October 1, 2019	3.1608	(814,506)	(407,253)	(65,485)	-
	(5,442,030)	October 1, 2018	3.3994	(4,802,634)	(639,396)	-	-
	(26,462,974)	October 1, 2017	3.5571	(26,462,974)	-	-	-
	<u>\$ (34,643,686)</u>			<u>\$ (32,309,645)</u>	<u>\$ (1,529,162)</u>	<u>\$ (804,879)</u>	<u>\$ -</u>
2. Assumption Changes	\$ -	October 1, 2021	2.8871	\$ -	\$ -	\$ -	\$ -
	-	October 1, 2020	3.1414	-	-	-	-
	19,942,113	October 1, 2019	3.1608	12,618,408	6,309,204	-	1,014,501
	-	October 1, 2018	3.3994	-	-	-	-
	-	October 1, 2017	3.5571	-	-	-	-
	<u>\$ 19,942,113</u>			<u>\$ 12,618,408</u>	<u>\$ 6,309,204</u>	<u>\$ -</u>	<u>\$ 1,014,501</u>
3. Difference between Expected and Actual Investment Earnings	\$ (58,997,886)	October 1, 2021	5.0000	\$ -	\$ (11,799,577)	\$ (47,198,309)	\$ -
	11,148,501	October 1, 2020	5.0000	2,229,700	2,229,700	-	6,689,101
	25,221,630	October 1, 2019	5.0000	10,088,652	5,044,326	-	10,088,652
	9,652,923	October 1, 2018	5.0000	5,791,755	1,930,585	-	1,930,583
	(28,385,051)	October 1, 2017	5.0000	(22,708,040)	(5,677,011)	-	-
	<u>\$ (41,359,883)</u>			<u>\$ (4,597,933)</u>	<u>\$ (8,271,977)</u>	<u>\$ (47,198,309)</u>	<u>\$ 18,708,336</u>
4. Total	\$ (56,061,456)			\$ (24,289,170)	\$ (3,491,935)	\$ (48,003,188)	\$ 19,722,837

B. Deferred Outflows and Deferred (Inflows) of Resources by Year to be Recognized in Future Pension Expenses

Year Ending September 30	Differences between Expected and Actual Non-Investment Experience	Assumption Changes	Differences between Expected and Actual Investment Experience	Year Ending September 30	Deferred Outflows of Resources	Deferred (Inflows) of Resources	Net Deferred Outflows/ (Inflows) of Resources
2022	\$ (547,998)	\$ 1,014,501	\$ (2,594,968)	2022	\$ 10,219,110	\$ (12,347,575)	\$ (2,128,465)
2023	(256,881)	-	(4,525,551)	2023	7,274,026	(12,056,458)	(4,782,432)
2024	-	-	(9,569,876)	2024	2,229,701	(11,799,577)	(9,569,876)
2025	-	-	(11,799,578)	2025	-	(11,799,578)	(11,799,578)
2026	-	-	-	2026	-	-	-
Thereafter	-	-	-	Thereafter	-	-	-
Total	\$ (804,879)	\$ 1,014,501	\$ (28,489,973)	Total	\$ 19,722,837	\$ (48,003,188)	\$ (28,280,351)



SECTION F

SUMMARY OF BENEFITS

Summary of Benefits

The Retirement System was revised effective January 1, 1960, under Ordinance 49623.

Prior to January 1, 1960, there were two groups of members, one group referred to as “Old Plan” and the other group as “New Plan.” There is no longer a need for this separation in the active members because the revised system makes no distinction between the “Old Plan” members and the “New Plan” members. The retirees are divided into Old Plan, 1944 Plan (New Plan), and 1960 Plan (Ordinance 49623).

Provisions Attributable to Board Bill 109

First effective with the actuarial valuation as of October 1, 2013, the actuarial valuation reflects the changes attributable to Ordinance 69245, Ordinance 69353, and Judge Dierker’s subsequent ruling (Board Bill 109 or BB109). Our understanding of the key changes to the FRS is as follows:

- FRS is frozen as of February 1, 2013. That is, benefits paid from FRS will be based on the member’s service and salary earned as of February 1, 2013. Participants with benefit service in FRS are classified as “grandfathered” members.
- Firefighters hired after February 1, 2013, are not members of FRS.
- Vesting and eligibility service earned after February 1, 2013, in the newly established Firemen’s Retirement Plan of St. Louis (FRP) will count towards vesting and eligibility service in FRS.
- Ancillary benefits, for pre-retirement death or disability occurring after February 1, 2013, are assumed to be paid from the newly established FRP. FRS members who become disabled or die before retirement are eligible for a refund of contributions made to FRS.
- Employer contributions to the frozen FRS will continue to be calculated under the Frozen Initial Liability cost method.
- Member contributions after February 1, 2013, from “grandfathered” participants in FRS will be paid to the FRP.
- Grandfathered members with 20 or more years of service as of February 1, 2013, are eligible to retire with unreduced FRP benefits if retirement commences before age 55.
- Grandfathered members with less than 20 years of service as of February 1, 2013, are eligible to retire with actuarially reduced FRP benefits if retirement commences before age 55.

Service Retirement

Retirements after June 3, 1978: Voluntary retirement after 20 or more years of service. The monthly retirement allowance consists of 40 percent of the final two-year average monthly compensation at 20 years of service, plus 2.0 percent of such final average compensation for each of the next five years of service (50 percent of final average compensation after 25 years of service), plus 4.0 percent of such final average compensation for each additional year of service over 25 years, but with a maximum of 30 years (70 percent of final average compensation after 30 years of service).

Effective October 3, 1982, any retired fireman may act as a special advisor to the Retirement System and thereby be entitled to a minimum pension of \$350.00 per month.

Effective October 1, 1989, any unused accrued sick leave will be added to the years of service used to determine the monthly pension allowance. If the total years of service are limited to 30 years as described above, the unused accrued sick leave will be added to 30.



Summary of Benefits

Effective November 28, 1995, the monthly retirement allowance consists of 40 percent of the final two-year average monthly compensation at 20 years of service, plus 2.0 percent of such final average compensation for each of the next five years of service (50 percent of final average compensation after 25 years of service), plus 5.0 percent of such final average compensation for each additional year of service over 25 years, but with a maximum of 30 years (75 percent of final average compensation after 30 years of service).

Effective July 1, 2002, a Member has three options for use of unused sick leave and service retirement:

- Receive 100 percent of the value (sick leave multiplied by rate of pay) as a lump sum deposit into the DROP account;
- Receive 100 percent of the sick leave as service added to the credited service used in the calculation of the retirement benefit; or
- Receive 50 percent of the value as a lump sum deposit into the DROP account, and receive 25 percent as service added to the credited service used in the calculation of the retirement benefit and receive 25 percent of the value as additional pay solely for purposes of determining the final average earnings used in the calculation of the retirement benefit.

In 2010, the City of St. Louis passed ordinances 67845 and 67846 which effectively ended the practice of firefighters accruing sick leave for retirement benefit purposes. Sick leave accrued prior to September 26, 2010, can be converted to a pension benefit at retirement.

As part of the 2015 Settlement Agreement, accrued sick leave earned through February 1, 2013, can be converted to a pension benefit at retirement.

Ordinary Disability Retirement

Provides a service retirement allowance if 20 or more years of service. Provides for a monthly retirement allowance after five years of service (but less than 20 years) which is the largest of (a) 90 percent of the monthly service retirement allowance based on the actual service or (b) one-fourth of the final two-year average monthly compensation. In addition, a monthly benefit of 10 percent of the final two-year average monthly compensation, for each unmarried dependent child under age eighteen, but not in excess of three children, is provided.

Benefits are paid by FRS if disability occurred prior to February 1, 2013.



Summary of Benefits

Accidental Disability Retirement

Provides for retirement if the member is totally and permanently incapacitated for duty as the result of an accident or exposure occurring while in the actual performance of duty. The monthly retirement allowance is 75 percent of the highest monthly salary in effect for the highest step in the range of salary, for his rank held at retirement.

If the accident immediately, totally, and permanently incapacitates the member from performing any type of work and confines him to his home, the Board may provide an increased retirement allowance not to exceed 100 percent of the member's actual rate of compensation as of the date his disability allowance began.

Benefits are paid by FRS if disability occurred prior to February 1, 2013.

DROP Benefit

A member eligible for service retirement may defer receipt of the service retirement benefit for up to five years while continuing active employment. Contributions by the member while in the DROP are one percent of annual compensation. The amount the member would have received as a service retirement benefit is deposited into the DROP account. A member terminating the DROP plan may retire or continue active service. Service while in the DROP will not count as creditable service. Upon termination of employment, the member may choose to receive the DROP account with the interest earned by the account.

Ordinary Death Benefit

Provides for the following benefits after death which occurs:

- (1) While in service, a monthly retirement allowance to the widow during widowhood of the greater of (1) 50 percent^a of the final two-year average monthly compensation or (2) \$200. In addition, 10 percent of each unmarried dependent child under age 18 in her care, but not in excess of three children. **Benefits are paid by FRS if death occurred prior to February 1, 2013.**
- (2) After service retirement, accidental disability retirement or ordinary disability retirement, a monthly allowance to the widow during widowhood of the greater of (1) 50 percent^a of the final two-year average monthly compensation, or (2) \$200. In addition, 10 percent of such compensation for each unmarried dependent child under 18 in her care but not in excess of three children. **Benefits are paid by FRS if retirement occurred prior to February 1, 2013.**

^a Assumes the widow has applied for and been appointed to the status of special consultant; if not, the amount is 25 percent.

Summary of Benefits

Accidental Death Benefit

Provides, if death is the result of an accident or exposure while in the actual performance of duty, a monthly allowance to the widow during her widowhood of the greater of (1) 50 percent of the final two-year average monthly compensation or (2) \$200. In addition, 10 percent for each unmarried dependent child under 18 in her care but not in excess of three children. **Benefits are paid by FRS if death occurred prior to February 1, 2013.**

\$2,000 Lump Sum Death Benefit

Provides a \$2,000 lump sum amount upon the death of an active or retired member. **Lump sum death benefits are paid by FRS if retirement occurred prior to February 1, 2013, or if pre-retirement death occurred prior to February 1, 2013.**

Cost-of-Living Adjustments

(Ordinance 56444) Retirement allowances to members who retired after March 16, 1973, and prior to December 28, 1983, shall be increased 3.0 percent whenever the Consumer Price Index released by the U.S. Department of Labor shows an increase of at least 3.0 percent for three consecutive months in the preceding twelve-month period. Prior to August 31, 1980, each increase was applied to the base retirement benefit at time of retirement. Commencing August 31, 1980, the cost-of-living adjustment is made to the current retirement benefit.

Ordinance 59018 changed the cost-of-living provision for anyone retiring after December 28, 1983. For those members who retired subsequent to December 28, 1983, the cost-of-living increases for service or ordinary disability retirement are based upon the number of years of service at retirement, and are subject to a maximum of the actual increase in the Consumer Price Index over the most recent 12 months.

For a member with less than 25 years of service at retirement, the cost-of-living is 1.5 percent per year up to age 60 and 5.0 percent per year after age 60 with a 25 percent maximum applied past age 60. For a member with at least 25 years of service but less than 30 years at retirement, the cost-of-living increase is 2.25 percent per year up to age 60 and 5.0 percent per year after age 60 with a 25 percent maximum applied past age 60. For a member with 30 or more years of service at retirement, the cost-of-living increase is 3.0 percent per year up to age 60 and 5.0 percent per year after age 60 with a 25 percent maximum applied past age 60. For a member who retires at age 60 or later, the cost-of-living increase is 5.0 percent per year with a 25 percent maximum applied.

For a member who retires with an accidental disability retirement, the cost-of-living increase is 3.0 percent per year up to age 60 and 5.0 percent per year after age 60 with a 25 percent maximum applied past age 60.



Summary of Benefits

Return of Contributions

Upon service retirement, ordinary disability, accidental disability, or death of an active member, contributions without interest are refunded. Upon withdrawal from service of a member prior to eligibility for a service retirement allowance, the entire amount of the member's contributions with interest accumulated is returned to the member in lieu of any other benefits.

SECTION G

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial Cost Method

Actuarial Cost Method for GASB Statement Nos. 67 and 68 Reporting Purposes

The method used in this GASB Statements No. 67 and 68 report is the Entry Age Actuarial Cost Method (EAN). The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

The actuarial accrued liability is equal to the present value of frozen accrued benefits as of February 1, 2013, and DROP balances as of the measurement date.

The actuarial liability is based on frozen benefits and DROP balances provided by FRS. This actuarial valuation assumes FRP will be responsible for benefits due to disability or pre-retirement death occurring after the freeze date.

Actuarial Cost Method

The method used in the funding valuation is the Frozen Entry Age Actuarial Cost Method. This method determines a normal cost on an aggregate basis expressed as a level percentage of pay. The normal cost rate equals the ratio of (a) the present value of future benefits less the actuarial value of assets less the frozen unfunded actuarial liability, to (b) the present value of future salaries. Under this method, the actuarial gains (losses), as they occur, reduce (increase) future normal costs.

Amortization of Frozen Unfunded Accrued Liabilities

Unfunded actuarial accrued liabilities attributable to changes in assumptions, plan provisions or methods are amortized on a level basis over 30 years from the creation of the unfunded base.

The total contribution is equal to the normal cost plus the amortization of the frozen unfunded accrued liabilities.

Existing frozen unfunded accrued liabilities are fully funded if the actuarial value of assets is greater than the present value of future benefits.

Actuarial Value of Assets

The calculated value is determined by adjusting the market value of assets, excluding the future benefit fund, to reflect the investment gains and losses (the difference between the actual investment return and the expected investment return) during each of the last three years at a rate of 33 percent per year.

Actuarial Assumptions

The Board adopts the assumptions after consultation with the actuary. All actuarial assumptions are expectations of future experience and are not market measures. The rationale for the actuarial assumptions may be found in the experience study report covering the period October 1, 2014, through September 30, 2018.

Interest

For funding purposes, the assumed rate of investment return used was 6.75 percent per year, compounded annually, net of investment and administrative expenses, annually.

For GASB Statements No. 67 and 68 reporting purposes, the assumed rate of investment return used was 7.00 percent, net of investment expenses, and includes an administrative expense assumption of 25 basis points.

General Inflation

2.50 percent per year, compounded annually.

This assumption serves as the basis for the determination of annual increases that are equal to the annual increase in the Consumer Price Index-U during the preceding 12-month calendar year.

Actuarial Assumptions

Mortality

Mortality assumptions for employees and retirees are as follows:

Applicable Group	Base Mortality Table
Pre-retirement	Pub-2010 Public Safety Employee, sex distinct
Post-retirement	Pub-2010 Public Safety Healthy Retiree, sex distinct
Post-disability	Pub-2010 Public Safety Disabled Retiree, sex distinct

Future mortality improvements are reflected by projecting the base mortality tables forward from the year 2010 using the MP-2019 projection scale.

Illustrative rates are shown below.

Sample Mortality Rates								
	Future Life Expectancy (years) in 2021				Future Life Expectancy (years) in 2035			
	Post-retirement		Disabled - Retiree		Post-retirement		Disabled - Retiree	
Age	Male	Female	Male	Female	Male	Female	Male	Female
35	51.33	53.52	49.12	51.40	52.66	54.82	50.61	52.87
40	46.06	48.20	44.14	46.35	47.36	49.49	45.57	47.78
45	40.83	42.91	39.16	41.32	42.11	44.19	40.55	42.72
50	35.67	37.68	34.21	36.32	36.93	38.94	35.56	37.68
55	30.60	32.56	29.34	31.45	31.83	33.80	30.65	32.78
60	25.71	27.65	24.67	26.85	26.89	28.85	25.91	28.10
65	21.09	23.00	20.31	22.52	22.20	24.11	21.46	23.66
70	16.79	18.59	16.27	18.38	17.79	19.61	17.28	19.41
75	12.86	14.50	12.53	14.46	13.74	15.43	13.42	15.40

Actuarial Assumptions

Termination

Rates of separation are represented by the following table. This assumption measures the probabilities of members terminating employment.

Employee Withdrawal Rate Per 1,000 Employees	
Years of Service	Number of Withdrawals
0	75.0
1	100.0
2	50.0
3	50.0
4	22.5
5	12.5
6	12.5
7	12.5
8	12.5
9	12.5
10	12.5
11	12.5
12	12.5
13	12.5
14	12.5
15	10.0
16	5.0
17	5.0
18	5.0
19	5.0
20 or more	0.0

It is assumed that terminated employees will not be rehired. The rates do not apply to members eligible to retire and do not include separation on account of death or disability.

Actuarial Assumptions

Salary Increases

This assumption is used to project a member's current salary for purposes of determining the present value of future salaries. Because FRS benefits have been frozen as of February 1, 2013, this assumption is not used to determine benefits.

Illustrative rates of increase per individual employee per year, compounded annually:

Salary Increase Assumptions For an Individual Member	
Sample Service	Increase Next Year
0	3.75%
1	3.75%
2	3.75%
3	3.75%
4	3.75%
5	3.25%
6	3.25%
7	3.25%
8	3.25%
9	3.25%
10	2.75%
11	2.75%
12	2.75%
13	2.75%
14	2.75%
15 or more	2.75%

The underlying salary increase assumption is based on a wage inflation assumption of 2.75 percent per year, comprised of 2.50 percent for general inflation plus 0.25 percent for productivity increases. The rates shown above include wage inflation plus an age-based component for merit, promotion, and longevity.

Actuarial Assumptions

Disability

The rates of disability for active members are broken out between ordinary and accidental disability. Ordinary disability accounts for 20 percent of total disabilities and accidental disability accounts for 80 percent of total disabilities. Illustrative rates of disability from the plan are as follows for members:

Employee Disablement Number Per 1,000 Employees		
Age	Ordinary	Accidental
25	0.50	2.00
30	1.00	4.00
35	1.00	4.00
40	1.50	6.00
45	1.50	6.00
50	1.50	6.00
55	1.50	6.00
60	1.50	6.00

Rates of disability are based on the disability rates used by FRP which were updated in an experience study for the period October 1, 2013, through September 30, 2017, performed by the actuary for FRP (Cheiron).

Actuarial Assumptions

Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Rates of Retirement	
Years of Service	Rate of Retirement
20	5.00 %
21	2.00
22	2.00
23	2.00
24	2.00
25	3.00
26	3.00
27	3.00
28	3.00
29	3.00
30	7.50
31	7.50
32	7.50
33	15.00
34	15.00
35 or more	100.00

100 percent retirement assumed at age 70

It was assumed that grandfathered members with less than 20 years of service as of February 1, 2013, will not retire prior to age 55. The retirement rates for the year the member first becomes eligible at age 55 were increased by 5.00 percent for each year of service over 20 years.

Actuarial Assumptions

DROP Benefits

Members are assumed to enter the DROP with 26 years of service. If the member has more than 26 years of service at the actuarial valuation date, the member is assumed to enter the DROP the following year. Members with less than 20 years of service as of February 1, 2013, are assumed to enter the DROP at the later of 26 years of service or age 55.

Members who enter the DROP with less than 30 years of service are assumed to return to active status after completing five years in the DROP.

DROP balances are assumed to earn 6.75 percent per year.

If a member with a DROP balance dies prior to termination of employment, it is assumed that a lump sum payment equal to the amount in the member's DROP account is paid to the beneficiary or the member's estate.

DROP distribution rates for current retired members with DROP balances:

- 4.50 percent distribution per year from retirement age to age 72;
- 5.00 percent distribution at age 73 increasing by 0.50 percent per year to 11.00 percent at age 85; and
- 12.00 percent at age 86 increasing by 1.00 percent per year.

DROP distribution rates for members who retire in the future with DROP balances are based on a uniform 30-year distribution rate upon retirement.

Pursuant to BB109, it is assumed that DROP benefits do not include salary increases after February 1, 2013.

Actuarial Assumptions

Sick Leave Benefits

In 2010, the City of St. Louis passed ordinances 67845 and 67846 which effectively ended the practice of firefighters accruing sick leave for retirement benefit purposes. Sick leave accrued prior to September 26, 2010, can still be used for retirement benefit purposes. Based on the 2015 Settlement between FRS and the City, the accrued sick leave balance as of February 1, 2013, can be converted to a pension benefit upon retirement.

The frozen sick leave balance as of February 1, 2013, is assumed to be utilized by the member at a rate of 3.0 percent per year.

Members are assumed to convert unused sick leave balances at retirement in to a pension benefit and receive:

- 50 percent of the value as a lump sum deposit into the DROP account;
- 25 percent as service added to the credited service used in the calculation of the retirement benefit; and
- 25 percent of the value as additional pay solely for purposes of determining the final average earnings used in the calculation of the retirement benefit.

Pursuant to BB109, and subsequent settlement agreements, it is assumed that sick leave benefits do not include salary increases after February 1, 2013.

Marriage Assumption

100.0 percent of active participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

Spouse's Age

For members whose spouse information is not provided, the female spouse is assumed to be three years younger than the male spouse for valuation purposes.

Shift Differential

No assumption is made for shift differential because it was removed for active members for City fiscal year ending June 30, 2011, and is not expected to be reinstated.

Administrative Expenses

Administrative expenses are assumed to be approximately 25 basis points.

Actuarial Assumptions

Decrement Timing

All decrements are assumed to occur mid-year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Turnover decrements do not operate after a member reaches retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

415(b) and 401(a)(17) Limits

No explicit assumption is made with respect to these items.

SECTION H

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statements No. 67 and 68 include specific requirements for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses, and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed actuarial valuation discount rate is used. In years where assets are not projected to be available or sufficient to meet benefit payments, the use of a “risk-free” rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

The long-term expected rate of return for the FRS funding is assumed to be 6.750%. Per Statute, this rate is net of both investment and administrative expenses. GASB Statements No. 67 and 68 requires the long-term expected rate of return to be determined net of pension plan investment expense but without reduction for pension plan administrative expense. Administrative expenses are assumed to be approximately 25 basis points; consequently, the long-term expected rate of return used for purposes of GASB Statements No. 67 and 68 is increased by 25 basis points to 7.000%. This rate is gross of administrative expenses.

For the purpose of this actuarial valuation, the expected rate of return on pension plan investments is 7.000%, the municipal bond rate is 2.190%, and the resulting single discount rate is 7.000%.

The following tables show the projection of assets and funded ratios for current members as of the actuarial valuation date.

Projection of Assets and Funded Ratio

Plan Year End 9/30	Market Value of Assets (boy)	Normal Contribution	Accrued Liability		Total Employer Contributions	Benefit Expenses	Benefit Payments	Income on Cash Flow	Market Value of Assets (eoy)	Present Value of Benefits (eoy)	Funded Ratio (eoy)	Frozen Unfunded Liability	Expected Salary	Present Value of Future Salary
			Amortization Payment											
2022	\$ 492,554,234	\$ 998,887	\$ 1,297,238	\$ 2,296,125	\$ 1,145,367	\$ 37,287,249	\$ 33,156,405	\$ 489,574,148	\$ 473,970,672	103%	\$ 15,923,896	\$ 30,343,236	\$ 207,989,882	
2023	489,574,148	-	1,297,238	1,297,238	1,139,734	35,988,661	32,992,675	486,735,666	468,780,246	104%	15,701,521	29,133,533	189,637,781	
2024	486,735,666	-	-	-	1,130,431	38,009,871	32,724,755	480,320,118	461,151,155	104%	15,464,134	26,761,403	171,338,305	
2025	480,320,118	-	-	-	1,114,929	38,006,680	32,276,310	473,474,819	453,010,398	105%	15,210,725	24,830,132	154,335,831	
2026	473,474,819	-	-	-	1,096,156	39,851,439	31,734,311	464,261,535	442,414,136	105%	14,940,210	22,052,532	138,247,338	
2027	464,261,535	-	-	-	1,074,180	39,610,515	31,098,427	454,675,267	431,351,548	105%	14,651,437	19,825,596	124,037,961	
2028	454,675,267	-	-	-	1,052,362	38,493,388	30,466,577	445,596,093	420,696,451	106%	14,343,170	18,966,229	111,246,691	
2029	445,596,093	-	-	-	1,030,056	38,793,497	29,821,476	435,594,016	409,012,062	106%	14,014,096	17,496,176	98,509,394	
2030	435,594,016	-	-	-	1,006,260	38,481,139	29,132,897	425,239,513	396,861,704	107%	13,662,808	16,368,336	86,481,613	
2031	425,239,513	-	-	-	981,250	38,468,878	28,409,364	414,198,749	383,903,866	108%	13,287,810	15,010,027	74,845,924	
2032	414,198,749	-	-	-	955,229	37,920,480	27,656,275	402,979,316	370,637,979	109%	12,887,498	13,866,251	63,874,822	
2033	402,979,316	-	-	-	928,211	37,839,775	26,874,622	391,085,952	356,560,028	110%	12,460,166	12,306,817	53,384,153	
2034	391,085,952	-	-	-	899,664	37,676,320	26,048,693	378,558,661	341,700,697	111%	12,003,988	10,203,692	43,850,052	
2035	378,558,661	-	-	-	870,489	36,764,963	25,204,144	366,127,353	326,779,974	112%	11,517,019	8,950,153	35,917,488	
2036	366,127,353	-	-	-	841,369	35,999,533	24,361,291	353,647,742	311,642,944	113%	10,997,179	7,811,952	28,787,628	
2037	353,647,742	-	-	-	812,202	35,176,682	23,517,035	341,175,893	296,334,333	115%	10,442,251	6,779,171	22,391,535	
2038	341,175,893	-	-	-	783,069	34,341,854	22,673,733	328,724,703	280,854,934	117%	9,849,863	5,587,960	16,666,198	
2039	328,724,703	-	-	-	754,222	33,311,075	21,838,609	316,498,015	265,395,675	119%	9,217,491	4,839,823	11,826,021	
2040	316,498,015	-	-	-	725,611	32,533,515	21,010,480	304,249,369	249,696,291	122%	8,542,433	3,385,366	7,457,763	
2041	304,249,369	-	-	-	697,305	31,460,426	20,190,971	292,282,609	234,045,913	125%	7,821,809	2,353,476	4,347,290	
2042	292,282,609	-	-	-	669,746	30,332,635	19,393,051	280,673,279	218,504,366	128%	7,052,542	1,574,526	2,128,395	
2043	280,673,279	-	-	-	642,999	29,247,945	18,618,641	269,400,975	203,034,465	133%	6,231,351	591,253	591,253	
2044	269,400,975	-	-	-	617,210	28,044,397	17,871,878	258,611,247	187,763,851	138%	5,354,728	-	-	
2045	258,611,247	-	-	-	592,635	26,801,516	17,160,208	248,377,303	172,746,614	144%	4,418,934	-	-	
2046	248,377,303	-	-	-	569,387	25,571,439	16,486,957	238,723,434	157,986,627	151%	3,419,973	-	-	
2047	238,723,434	-	-	-	547,567	24,320,571	15,854,976	229,710,272	143,522,736	160%	2,353,583	-	-	
2048	229,710,272	-	-	-	527,240	23,115,175	15,266,230	221,334,087	129,327,947	171%	1,215,212	-	-	
2049	221,334,087	-	-	-	508,633	21,761,004	14,727,131	213,791,581	115,574,138	185%	-	-	-	
2050	213,791,581	-	-	-	491,961	20,472,752	14,244,056	207,070,924	102,222,967	203%	-	-	-	
2051	207,070,924	-	-	-	477,272	19,186,717	13,818,365	201,225,300	89,299,323	225%	-	-	-	

Employer contributions and present value of benefits shown above are based on the funding policy and a discount rate assumption of 6.75%. Funding policy contributions are based on the actuarial value of assets with a three-year smoothing of investment gains and losses.

The expected return on assets of 7.00% is net of investment expenses.

Administrative expenses are based on 0.25% of the average asset value during the year.



Development of Single Discount Rate

Plan Year End 10/1	Benefit Payments	Discount Rate	Discounted Benefit Payments
2022	\$37,287,249	7.000%	\$36,046,944
2023	35,988,661	7.000%	32,515,469
2024	38,009,871	7.000%	32,094,969
2025	38,006,680	7.000%	29,992,779
2026	39,851,439	7.000%	29,391,179
2027	39,610,515	7.000%	27,302,330
2028	38,493,388	7.000%	24,796,569
2029	38,793,497	7.000%	23,355,039
2030	38,481,139	7.000%	21,651,392
2031	38,468,878	7.000%	20,228,498
2032	37,920,480	7.000%	18,635,633
2033	37,839,775	7.000%	17,379,413
2034	37,676,320	7.000%	16,172,280
2035	36,764,963	7.000%	14,748,680
2036	35,999,533	7.000%	13,496,840
2037	35,176,682	7.000%	12,325,550
2038	34,341,854	7.000%	11,245,827
2039	33,311,075	7.000%	10,194,655
2040	32,533,515	7.000%	9,305,316
2041	31,460,426	7.000%	8,409,708
2042	30,332,635	7.000%	7,577,792
2043	29,247,945	7.000%	6,828,796
2044	28,044,397	7.000%	6,119,432
2045	26,801,516	7.000%	5,465,635
2046	25,571,439	7.000%	4,873,631
2047	24,320,571	7.000%	4,331,990
2048	23,115,175	7.000%	3,847,929
2049	21,761,004	7.000%	3,385,517
2050	20,472,752	7.000%	2,976,724
2051	19,186,717	7.000%	2,607,229
2061	6,068,607	7.000%	419,208
2071	1,051,698	7.000%	36,931
2081	138,568	7.000%	2,474
2091	33,153	7.000%	301
2101	9,847	7.000%	45
2111	465	7.000%	1
2121	1	7.000%	0
Total Present Value - October 1, 2021			\$470,255,361



SECTION I

GLOSSARY OF TERMS

Glossary of Terms

<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Accrued Liability (AAL)</i>	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income, and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation, and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Equivalent</i>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value (APV)</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.

Glossary of Terms

<i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.
<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Deferred Retirement Option Program (DROP)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the actuarial valuation report.

Glossary of Terms

<i>Discount Rate</i>	<p>For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:</p> <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
<i>Entry Age Actuarial Cost Method (EAN)</i>	<p>The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.</p>
<i>Fiduciary Net Position</i>	<p>The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.</p>
<i>GASB</i>	<p>The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.</p>
<i>Long-Term Expected Rate of Return</i>	<p>The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.</p>
<i>Money-Weighted Rate of Return</i>	<p>The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 68, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.</p>
<i>Multiple-Employer Defined Benefit Pension Plan</i>	<p>A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.</p>
<i>Municipal Bond Rate</i>	<p>The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.</p>
<i>Net Pension Liability (NPL)</i>	<p>The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.</p>

Glossary of Terms

<i>Non-Employer Contribution Entities</i>	Non-employer contribution entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contribution entities.
<i>Normal Cost</i>	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
<i>Other Postemployment Benefits (OPEB)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (TPL)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (UAAL)</i>	The UAAL is the difference between actuarial accrued liability and actuarial valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statements No. 67 and 68, the valuation assets are equal to the market value of assets.