Firemen’s Retirement System of St. Louis

GASB Statement Nos. 67 and 68 Plan Reporting and Accounting Schedules as of October 1, 2019

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January 20, 2020

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, 2019, for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

The actuarial valuation as of October 1, 2019, uses updated 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.

The signing actuaries are independent of the plan sponsor.

Alex Rivera and Lance J. Weiss 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,

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

Lance J. Weiss, EA, MAAA, FCA
Senior Consultant and Team Leader

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, 2019

		2019
Actuarial Valuation Date		October 1, 2019
Pension Plan's Fiscal Year Ending Date (Measurement Date & Reporting Date)		October 1, 2019
Membership		
Number of		
- Retirees and Beneficiaries		890
- Active DROP Members		76
- Active Non-DROP Members		415
- Total		1,381
Covered Payroll [1]	$	28,991,522
Net Pension Liability		
Total Pension Liability	$	475,309,000
Plan Fiduciary Net Position [2]		449,763,777
Net Pension Liability	$	25,545,223
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		94.63%
Net Pension Liability as a Percentage of Covered Payroll		88.11%
Development of the Single Discount Rate		
Single Discount Rate Beginning of Year		7.300%
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]		3.83%
Long-Term Municipal Bond Rate End of Year [3]		2.75%
Year Plan is projected to be fully funded		2049
GASB No. 68 Pension Expense	$	4,681,853

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	$ -	$ (7,265,030)
Changes in assumptions	13,632,909	-
Difference between expected and actual investment earnings	25,969,057	(12,703,699)
Total	$ 39,601,966	$ (19,968,729)

[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, 2019, and a measurement date of October 1, 2019.

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 2.750% (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 FRS is projected to be fully funded by 2049. 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 Changes in Fiduciary Net Position
As of October 1, 2019

		2019
Assets		
Investments		
Fixed income	$	112,533,926
Equities		228,603,284
Hedge funds		39,513,072
Real estate		47,438,602
Limited partnership units		15,441,597
Money market funds		6,798,018
Total Investments	$	450,328,499
Cash and Deposits	$	3,802,232
Receivables		
Interest and dividends	$	317,546
Unsettled investment transactions		1,000,000
Other receivables		327,188
Employer contributions		-
Total Receivables	$	1,644,734
Capital Assets, less Accumulated Depreciation	$	348,023
Total Assets	$	456,123,488
Deferred Outflows of Resources		
Systems' staff pension related	$	53,583
Liabilities		
Payables		
Unsettled investment transactions	$	1,250,000
Accrued investment management fees		296,393
Net pension liability - Systems' staff pension related		219,637
Members contributions refundable		24,528
Accrued administrative expenses		63,615
Due to The Firefighters' Retirement Plan of the City of St. Louis		-
Total Liabilities	$	1,854,173
Deferred Inflows of Resources		
Systems' staff pension related	$	13,117
Net Position	$	454,309,781
Future Benefit Fund Restricted for SHARE Program	$	4,546,004
Net Position Restricted for Pensions	$	449,763,777

Statement of Changes in Fiduciary Net Position
As of October 1, 2019

		2019
Additions		
Contributions		
Employer	$	-
Employee		-
Other		-
Total Contributions	$	-
Investment Income		
Net Appreciation in Fair Value of Investments	$	2,570,606
Dividends		4,796,083
Interest		2,530,349
Class Action Lawsuit Proceeds		13,154
Securities Lending Income		126,437
Less Investment Expense		(1,654,099)
Net Investment Income	$	8,382,530
Other	$	-
Total Additions	$	8,382,530
Deductions		
Benefit Payments		32,808,908
Benefit Payments SHARE Program		188,094
Refunds of Employee Contributions		2,027,172
Pension Plan Administrative Expense		1,027,225
Other		-
Total Deductions	$	36,051,399
Net Increase in Net Position	$	(27,668,869)
Transfer Out Due to Settlement Agreement	$	-
Net Position		
Beginning of Year	$	481,978,650
End of Year	$	454,309,781
Future Benefit Fund Restricted for SHARE Program	$	4,546,004
Net Position Restricted for Pensions	$	449,763,777

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,	2019	2018	2017	2016	2015	2014 - Restated	2014
Total Pension Liability							
Service Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,917,882
Interest on the Total Pension Liability	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	(1,287,244)	(5,442,030)	(26,462,974)	(6,984,303)	15,441	-	-
Assumption Changes	19,942,113	-	-	-	43,915,338	-	-
Benefit Payments	(32,808,908)	(32,161,027)	(32,015,540)	(32,154,888)	(33,561,947)	(34,001,921)	(34,001,921)
Refunds	(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	16,071,602	(5,522,264)	(24,758,491)	(5,501,406)	43,477,850	(757,677)	4,036,158
Total Pension Liability - Beginning	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)	$ 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	$ -	$ 2,715,141	$ 3,313,603	$ 2,715,140	$ -	$ 1,007,760	$ 1,007,760
Employee Contributions	-	-	-	-	-	-	-
Pension Plan Net Investment Income	8,307,594	24,519,983	60,390,472	38,228,538	(10,931,763)	48,269,780	48,269,780
Benefit Payments	(32,808,908)	(32,161,027)	(32,015,540)	(32,154,888)	(33,561,947)	(34,001,921)	(34,001,921)
Refunds	(2,027,172)	(649,093)	(816,435)	(1,278,330)	(1,294,477)	(1,205,393)	(1,205,393)
Pension Plan Administrative Expense	(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	-	(10,278,591)	(10,278,591)
Net Change in Plan Fiduciary Net Position	(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]	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)	$ 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)	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	94.63 %	103.90 %	104.06 %	92.67 %	90.31 %	109.53 %	106.33 %
Covered Employee Payroll	$ 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	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.*

10 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 %

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%

Ten fiscal years will be built prospectively.

Notes to Schedule of Contributions

Valuation Date:	October 1, 2019
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 Disable 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, 2019, uses updated 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	7.30% as of the October 1, 2018, actuarial valuation. 7.00% as of the October 1, 2019, 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

FY Ending October 1,	Annual Return[1]
2013	14.41 %
2014	10.32 %
2015	(2.42)%
2016	9.20 %
2017	14.69 %
2018	5.82 %
2019	1.80 %

[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, 2019. 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, 2019, these best estimates are summarized in the following table:

Asset Allocation

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Core Bonds	5.00%	2.62%
Core Plus	22.00%	2.89%
Absolute Return	3.00%	4.24%
US Large Cap Equity	18.00%	7.21%
US Small Cap Equity	8.00%	8.42%
International Developed Equity	17.00%	8.14%
Emerging Market Equity	5.00%	9.38%
Long/Short Equity	7.00%	5.63%
Core Real Estate	10.00%	6.78%
Value Add Real Estate	5.00%	8.29%
MLPs	0.00%	6.51%
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%
$70,746,769	$25,545,223	$(12,732,514)

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

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	890
Active Plan Members Currently in the DROP	76
Active Plan Members	415
Total Plan Members	1,381

Additional information about the member data used can be found in the October 1, 2019, funding actuarial valuation report.

SECTION E

GASB STATEMENT NO. 68 PENSION EXPENSE

Net Pension Liability
for Fiscal Year Ending October 1, 2019

A. Total pension liability		
1. Service Cost	$	-
2. Interest on the Total Pension Liability		32,252,813
3. Changes of benefit terms		-
4. Difference between expected and actual experience		(1,287,244)
5. Changes of assumptions		19,942,113
6. Benefit payments		(32,808,908)
7. Refunds of employee contributions		(2,027,172)
8. Net change in total pension liability	$	16,071,602
9. Total Pension liability - beginning (October 1, 2018)		459,237,398
10. Total Pension liability - ending (October 1, 2019)	**$**	**475,309,000**
B. Plan fiduciary net position		
1. Contributions – employer	$	-
2. Contributions – employee		-
3. Net investment income		8,307,594
4. Benefit payments, including refunds of employee contributions		(34,836,080)
5. Pension Plan Administrative Expense		(1,027,225)
6. Transfer (Out)/In Due to Settlement Agreement		166,792
7. Net change in plan fiduciary net position	$	(27,388,919)
8. Plan fiduciary net position - beginning (October 1, 2018)		477,152,696
9. Plan fiduciary net position - ending (October 1, 2019)	**$**	**449,763,777**
C. Net pension liability as of October 1, 2019	**$**	**25,545,223**
D. Plan fiduciary net position as a percentage of the total pension liability		**94.63%**
E. Covered-employee payroll	**$**	**28,991,522**
F. Net pension liability as a percentage of covered employee payroll		**88.11 %**

Pension Expense
for Fiscal Year Ending October 1, 2019

A. Expense		
1. Service Cost	$	-
2. Interest on the Total Pension Liability		32,252,813
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)		-
5. Projected Earnings on Plan Investments (made negative for addition here)		(33,529,224)
6. Pension Plan Administrative Expense		1,027,225
7. Other Changes - Transfer Due to Settlement Agreement		(166,792)
8. Recognition of Outflow (Inflow) due to Liability Experience		(10,893,957)
9. Recognition of Outflow (Inflow) due to Assumption Changes		6,309,204
10. Recognition of Outflow (Inflow) due to Investment Experience		9,682,584
11. Total Pension Expense	**$**	**4,681,853**
B. Reconciliation of Net Pension Liability		
1. Net Pension Liability beginning of year	**$**	**(17,915,298)**
2. Pension Expense		4,681,853
3. Employer Contributions		-
4. Change in Deferred Liability Experience (Inflows)/Outflows		9,606,713
5. Change in Deferred Assumption Changes (Inflows)/Outflows		13,632,909
6. Change in Deferred Investment Experience (Inflows)/Outflows		15,539,046
7. Net Pension Liability end of year	**$**	**25,545,223**

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods for Fiscal Year ending October 1, 2019

A. Outflows and (Inflows) of Resources Recognized in Current and Future Pension Expenses as of Fiscal Year End October 1, 2019

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	$ (1,287,244)	October 1, 2019	3.1608	$ -	$ (407,253)	$ (879,991)	$ -
and Actual Non-Investment Experience	(5,442,030)	October 1, 2018	3.3994	(1,600,878)	(1,600,878)	(2,240,274)	-
	(26,462,974)	October 1, 2017	3.5571	(14,878,806)	(7,439,403)	(4,144,765)	-
	(6,984,303)	October 1, 2016	3.7836	(5,537,880)	(1,446,423)	-	-
	15,441	October 1, 2015	3.5067	15,441	-	-	-
	$ (40,161,110)		3.4815	$ (22,002,123)	$ (10,893,957)	$ (7,265,030)	$ -
2. Assumption Changes	$ 19,942,113	October 1, 2019	3.1608	$ -	$ 6,309,204	$ -	$ 13,632,909
	-	October 1, 2018	3.3994	-	-	-	-
	-	October 1, 2017	3.5571	-	-	-	-
	-	October 1, 2016	3.7836	-	-	-	-
	43,915,338	October 1, 2015	3.8896	43,915,338	-	-	-
	$ 63,857,451		3.5581	$ 43,915,338	$ 6,309,204	$ -	$ 13,632,909
3. Difference Between Expected	$ 25,221,630	October 1, 2019	5.0000	$ -	$ 5,044,326	$ -	$ 20,177,304
and Actual Investment Earnings	9,652,923	October 1, 2018	5.0000	1,930,585	1,930,585	-	5,791,753
	(28,385,051)	October 1, 2017	5.0000	(11,354,020)	(5,677,010)	(11,354,021)	-
	(6,748,398)	October 1, 2016	5.0000	(4,049,040)	(1,349,680)	(1,349,678)	-
	48,671,807	October 1, 2015	5.0000	38,937,444	9,734,363	-	-
	$ 48,412,911		5.0000	$ 25,464,969	$ 9,682,584	$ (12,703,699)	$ 25,969,057
4. Total	**$ 72,109,252**			**$ 47,378,184**	**$ 5,097,831**	**$ (19,968,729)**	**$ 39,601,966**

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
2020	$ (6,152,896)	$ 6,309,204	$ (51,777)
2021	(1,046,649)	6,309,204	1,297,900
2022	(65,485)	1,014,501	6,974,909
2023	-	-	5,044,326
2024	-	-	-
Thereafter	-	-	-
Total	**$ (7,265,030)**	**$ 13,632,909**	**$ 13,265,358**

Year Ending September 30	Deferred Outflows of Resources	Deferred (Inflows) of Resources	Net Deferred Outflows/ (Inflows) of Resources
2020	$ 13,284,115	$ (13,179,584)	$ 104,531
2021	13,284,115	(6,723,660)	6,560,455
2022	7,989,410	(65,485)	7,923,925
2023	5,044,326	-	5,044,326
2024	-	-	-
Thereafter	-	-	-
Total	**$ 39,601,966**	**$ (19,968,729)**	**$ 19,633,237**

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.

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 for GASB 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.

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 2019				Future Life Expectancy (years) in 2035			
	Post-retirement		Disabled - Retiree		Post-retirement		Disabled - Retiree	
Age	Male	Female	Male	Female	Male	Female	Male	Female
35	51.16	53.34	48.94	51.21	52.66	54.82	50.61	52.87
40	45.89	48.02	43.96	46.16	47.36	49.49	45.57	47.78
45	40.66	42.73	38.99	41.13	42.11	44.19	40.55	42.72
50	35.50	37.50	34.03	36.13	36.93	38.94	35.56	37.68
55	30.43	32.38	29.16	31.26	31.83	33.80	30.65	32.78
60	25.55	27.50	24.50	26.69	26.89	28.85	25.91	28.10
65	20.96	22.86	20.18	22.38	22.20	24.11	21.46	23.66
70	16.67	18.46	16.14	18.25	17.79	19.61	17.28	19.41
75	12.74	14.37	12.41	14.33	13.74	15.43	13.42	15.40

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.

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.

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).

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.

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.

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 2.750%, 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	Assets (boy)	Normal Contribution	Accrued Liability Amortization Payment	Total Employer Contributions	Expenses	Benefit Payments	Income on Cash Flow	Assets (eoy)	Present Value of Benefits (eoy)	Funded Ratio (eoy)	Frozen Unfunded Liability	Expected Salary	Present Value of Future Salary
2020	$ 449,763,777	$ -	$ 1,297,238	$ 1,297,238	$ 1,043,899	$ 35,673,908	$ 30,220,076	$ 444,563,284	$ 481,936,540	92%	$ 16,327,351	$ 33,502,551	$ 251,067,871
2021	444,563,284	1,664,635	1,297,238	2,961,873	1,032,784	34,470,103	29,897,845	441,920,114	478,852,783	92%	16,132,210	32,896,920	232,250,990
2022	441,920,114	2,892,008	1,297,238	4,189,246	1,023,638	36,752,344	29,634,610	437,967,988	473,202,863	93%	15,923,896	30,976,605	212,810,452
2023	437,967,988	2,757,109	1,297,238	4,054,347	1,014,641	36,294,043	29,374,040	434,087,691	467,645,091	93%	15,701,521	29,816,822	194,107,651
2024	434,087,691	2,688,293	1,297,239	3,985,532	1,003,085	38,096,022	29,040,815	428,014,932	459,850,366	93%	15,464,134	27,500,132	175,380,450
2025	428,014,932	2,513,329	1,297,238	3,810,567	988,234	38,240,073	28,611,276	421,208,468	451,380,663	93%	15,210,725	25,539,342	157,862,226
2026	421,208,468	2,367,129	1,297,239	3,664,368	970,083	39,647,945	28,087,006	412,341,813	440,884,644	94%	14,940,210	22,682,974	141,254,695
2027	412,341,813	2,133,039	1,297,238	3,430,277	948,748	39,569,392	27,469,777	402,723,727	429,761,305	94%	14,651,437	20,377,639	126,575,307
2028	402,723,727	1,943,992	1,297,239	3,241,231	926,908	38,406,873	26,837,262	393,468,438	419,088,253	94%	14,343,170	19,490,249	113,366,015
2029	393,468,438	1,886,252	1,297,238	3,183,490	904,214	38,675,721	26,180,923	383,252,916	407,416,997	94%	14,014,096	17,935,926	100,212,388
2030	383,252,916	1,763,073	1,297,239	3,060,312	879,855	38,402,951	25,476,060	372,506,482	395,239,757	94%	13,662,808	16,709,990	87,830,121
2031	372,506,482	1,669,598	1,297,238	2,966,836	854,129	38,198,286	24,731,737	361,152,640	382,452,013	94%	13,287,810	15,351,375	75,920,735
2032	361,152,640	1,561,108	1,297,239	2,858,347	827,233	37,747,870	23,953,391	349,389,275	369,266,466	95%	12,887,498	14,088,188	64,657,780
2033	349,389,275	1,460,030	1,297,238	2,757,268	798,977	37,604,111	23,135,874	336,879,329	355,339,426	95%	12,460,166	12,479,046	53,983,048
2034	336,879,329	1,320,471	1,297,239	2,617,710	768,932	37,447,139	22,266,613	323,547,581	340,634,494	95%	12,003,988	10,323,478	44,305,520
2035	323,547,581	1,117,023	1,297,238	2,414,261	737,813	36,535,057	21,365,844	310,054,817	325,879,341	95%	11,517,019	9,076,036	36,275,835
2036	310,054,817	1,004,430	1,297,239	2,301,669	706,151	35,751,153	20,449,413	296,348,594	310,938,144	95%	10,997,179	7,922,567	29,035,788
2037	296,348,594	898,738	1,297,238	2,195,976	673,968	34,970,456	19,517,947	282,418,093	295,795,031	95%	10,442,251	6,853,084	22,538,356
2038	282,418,093	799,250	1,297,239	2,096,489	641,298	34,145,378	18,572,325	268,300,231	280,482,228	96%	9,849,863	5,648,859	16,744,031
2039	268,300,231	680,259	1,297,238	1,977,497	608,377	33,152,160	17,619,382	254,136,573	265,162,003	96%	9,217,491	4,849,366	11,844,096
2040	254,136,573	606,033	1,297,239	1,903,272	575,073	32,384,966	16,655,470	239,735,276	249,600,326	96%	8,542,433	3,399,665	7,466,872
2041	239,735,276	446,693	1,297,238	1,743,931	541,528	31,341,885	15,684,423	225,280,217	234,065,946	96%	7,821,809	2,351,709	4,341,748
2042	225,280,217	327,975	1,297,239	1,625,214	507,914	30,248,181	14,711,358	210,860,694	218,613,010	96%	7,052,542	1,570,436	2,124,364
2043	210,860,694	376,548	1,297,238	1,673,786	474,336	29,195,603	13,739,364	196,603,906	203,204,523	97%	6,231,351	591,320	591,320
2044	196,603,906	388,905	1,297,239	1,686,144	441,288	28,029,944	12,782,634	182,601,452	187,960,321	97%	5,354,728	-	-
2045	182,601,452	-	1,297,238	1,297,238	408,904	26,824,367	11,845,058	168,510,477	172,932,736	97%	4,418,934	-	-
2046	168,510,477	-	1,297,239	1,297,239	376,288	25,632,424	10,900,825	154,699,829	158,122,302	98%	3,419,973	-	-
2047	154,699,829	-	1,297,238	1,297,238	344,383	24,413,450	9,977,119	141,216,353	143,571,608	98%	2,353,583	-	-
2048	141,216,353	-	1,297,238	1,297,238	313,297	23,171,418	9,077,082	128,105,959	129,322,008	99%	1,215,212	-	-
2049	128,105,959	-	1,297,238	1,297,238	283,131	21,913,651	8,203,669	115,410,084	115,410,084	100%	-	-	-

Employer contributions and present value of benefits shown above are based on the funding policy and a discount rate assumption of 6.75%.
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
2021	$35,673,908	7.000%	$34,487,269
2022	34,470,103	7.000%	31,143,464
2023	36,752,344	7.000%	31,033,132
2024	36,294,043	7.000%	28,641,260
2025	38,096,022	7.000%	28,096,526
2026	38,240,073	7.000%	26,357,726
2027	39,647,945	7.000%	25,540,308
2028	39,569,392	7.000%	23,822,155
2029	38,406,873	7.000%	21,609,606
2030	38,675,721	7.000%	20,337,264
2031	38,402,951	7.000%	18,872,739
2032	38,198,286	7.000%	17,544,073
2033	37,747,870	7.000%	16,202,992
2034	37,604,111	7.000%	15,085,313
2035	37,447,139	7.000%	14,039,572
2036	36,535,057	7.000%	12,801,511
2037	35,751,153	7.000%	11,707,326
2038	34,970,456	7.000%	10,702,499
2039	34,145,378	7.000%	9,766,345
2040	33,152,160	7.000%	8,861,927
2041	32,384,966	7.000%	8,090,512
2042	31,341,885	7.000%	7,317,688
2043	30,248,181	7.000%	6,600,309
2044	29,195,603	7.000%	5,953,861
2045	28,029,944	7.000%	5,342,194
2046	26,824,367	7.000%	4,777,967
2047	25,632,424	7.000%	4,266,970
2048	24,413,450	7.000%	3,798,178
2049	23,171,418	7.000%	3,369,108
2050	21,913,651	7.000%	2,977,785
2060	7,965,786	7.000%	550,262
2070	1,590,950	7.000%	55,868
2080	205,139	7.000%	3,662
2090	41,003	7.000%	372
2100	13,530	7.000%	62
2110	1,104	7.000%	3
2120	3	7.000%	0
Total Present Value - October 1, 2019			**$475,309,000**

SECTION I

GLOSSARY OF TERMS

Glossary of Terms

Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Accrued Liability (AAL)	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."
Actuarial Assumptions	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.
Actuarial Cost Method	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.
Actuarial Equivalent	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.
Actuarial Gain (Loss)	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.
Actuarial Present Value (APV)	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.
Actuarial Valuation	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.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.

Glossary of Terms

Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)	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.
Amortization Method	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.
Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	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.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
Deferred Inflows and Outflows	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.
Deferred Retirement Option Program (DROP)	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

Discount Rate 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:

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; and
2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

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.

Fiduciary Net Position The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.

GASB The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Long-Term Expected Rate of Return 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.

Money-Weighted Rate of Return 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.

Multiple-Employer Defined Benefit Pension Plan A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.

Municipal Bond Rate 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.

Net Pension Liability (NPL) The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan.

Glossary of Terms

Non-Employer Contribution Entities — 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.

Normal Cost — The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

Other Postemployment Benefits (OPEB) — 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.

Real Rate of Return — The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.

Service Cost — The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

Total Pension Expense — The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Benefit Changes
4. Employee Contributions (made negative for addition here)
5. Projected Earnings on Plan Investments (made negative for addition here)
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to Liabilities
9. Recognition of Outflow (Inflow) of Resources due to Assets

Total Pension Liability (TPL) — The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

Unfunded Actuarial Accrued Liability (UAAL) — The UAAL is the difference between actuarial accrued liability and actuarial valuation assets.

Valuation Assets — 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.