Gabriel Roeder Smith & Company
Consultants & Actuaries

CITY OF GRAND RAPIDS POLICE AND FIRE RETIREMENT SYSTEM

GASB STATEMENT NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

MEASUREMENT DATE: DECEMBER 31, 2016

GASB NO. 68 REPORTING DATE: JUNE 30, 2017

GRS
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May 8, 2017

Mr. Jeff Dood, Deputy Chief Financial Officer
The Board of Trustees
City of Grand Rapids Police
and Fire Retirement System
Grand Rapids, Michigan

Dear Mr. Dood:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 for the City of Grand Rapids Police and Fire Retirement System ("the System"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

This report was prepared at the request of the City and is intended for use by the Retirement System and those designated or approved by the City. This report may be provided to parties other than the System only in its entirety and only with the permission of the City. GRS is not responsible for unauthorized use of this report.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statement Nos. 67 and 68. The calculation of the plan's liability for this report is not applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The Net Pension Liability is not an appropriate measure for assessing the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability also is not an appropriate measure for assessing the need for or amount of future employer contributions.

The valuation was based upon information furnished by the City and Plan Administrator, concerning Retirement System benefits, financial transactions, plan provisions, and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the City.

Mr. Jeff Dood, Deputy Chief Financial Officer
Board of Trustees
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This report complements the actuarial valuation report that was provided to the Board and should be considered in conjunction with that report. Please see the actuarial valuation report as of December 31, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the City of Grand Rapids Police and Fire Retirement System. 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 individuals are independent of the plan sponsor.

James D. Anderson 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 opinions contained herein.

Respectfully submitted,

James D. Anderson, FSA, EA, MAAA

David L. Hoffman

Jeffrey T. Tebeau, ASA, EA, MAAA

JDA\DLH:bd

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Actuarial Valuation Date	December 31, 2016
Measurement Date of the Net Pension Liability	December 31, 2016
Employer's Fiscal Year Ending Date (Reporting Date)	June 30, 2017
Membership	
Number of	
- Retirees and Beneficiaries	673
- Inactive, Nonretired Members	32
- Active Members	485
- Total	1,190
Covered Payroll#	$ 38,129,771
Net Pension Liability	
Total Pension Liability	$ 481,925,024
Plan Fiduciary Net Position	383,172,938
Net Pension Liability	$ 98,752,086
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	79.51%
Net Pension Liability as a Percentage of Covered Payroll	258.99%
Development of the Single Discount Rate	
Single Discount Rate	7.25%
Long-Term Expected Rate of Investment Return	7.25%
Long-Term Municipal Bond Rate*	3.78%
Last year ending January 1 in the 2017 to 2116 projection period for which projected benefit payments are fully funded	2116
Total Pension Expense	$ 33,802,544

Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	$ 14,881,035	$ -
Changes in assumptions	19,458,832	-
Net difference between projected and actual earnings on pension plan investments	23,930,419	272,090
Total	**$ 58,270,286**	**$ 272,090**

 # Reported rates of pay adjusted by gross-up factors to estimate covered payroll. The amount provided may not necessarily represent Covered Payroll as defined in GASB Statements No. 67 and 68.

**Source: "20-Bond GO Index" is the Bond Buyer Index, general obligation, 20 years to maturity, mixed quality. In describing this index, the Bond Buyer notes that the bonds' average credit quality is roughly equivalent to Moody's Investors Service's Aa2 rating and Standard & Poor's Corp.'s AA. The rate shown is as of December 29, 2016, the most recent date available on or before the measurement date.*

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 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 (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to the System subsequent to the measurement date of June 30, 2016.

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 the 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.

Notes to Financial Statements

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

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of 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 and the net 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 GASB 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.

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 payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.25% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain level as a percentage of payroll.
2. The unfunded liability is expected to be paid off in approximately 29 years, which is the number of years remaining in the closed amortization schedule of the unfunded liability.
3. The funded status of the plan is expected to reach a 100% funded ratio in approximately 29 years, which is the number of years remaining in the closed amortization schedule of the unfunded liability.

This funding policy results in the expectation that the plan's assets will be able to fully pay for promised benefits through at least 2116. The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2016 and a measurement date of December 31, 2016.

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 sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Bond Buyer Index) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.25%; the municipal bond rate is 3.78% (based on the weekly rate closest to but not later than the measurement date of the "20-Bond GO Index" rate from the Bond Buyer Index, general obligation, 20 years to maturity, mixed quality); and the resulting Single Discount Rate is 7.25%.

Effective Date and Transition

GASB Statement Nos. 67 and 68 became effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively.

SECTION B

FINANCIAL STATEMENTS

PENSION EXPENSE UNDER GASB STATEMENT NO. 68
MEASUREMENT DATE – DECEMBER 31, 2016
REPORTING DATE – JUNE 30, 2017

A. Expense

1. Service Cost	$ 8,588,314
2. Interest on the Total Pension Liability	32,676,161
3. Current Period Benefit Changes	114,084
4. Employee Contributions (made negative for addition here)	(4,929,842)
5. Projected Earnings on Plan Investments (made negative for addition here)	(26,561,337)
6. Pension Plan Administrative Expense	542,277
7. Other Changes in Plan Fiduciary Net Position	-
8. Recognition of Outflow (Inflow) of Resources due to Liabilities	15,588,685
9. Recognition of Outflow (Inflow) of Resources due to Assets	7,784,202
10. Total Pension Expense	**$33,802,544**

Statement of Outflows and Inflows Arising from the Current Reporting Period
Measurement Date – December 31, 2016
Reporting Date – June 30, 2017

A. Outflows (Inflows) of Resources due to Liabilities	
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$ 7,264,098
2. Assumption Changes (gains) or losses	$ 1,551,086
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}	4.2
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	$ 1,729,547
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$ 369,306
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$ 2,098,853
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$ 5,534,551
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$ 1,181,780
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$ 6,716,331
B. Outflows (Inflows) of Resources due to Assets	
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$ 848,395
2. Recognition period for Assets {in years}	5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$ 169,679
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$ 678,716

Statement of Outflows and Inflows Arising from the Current and Prior Reporting Periods
Measurement Date – December 31, 2016
Reporting Date – June 30, 2017

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Due to Liabilities	$ 15,588,685	$ -	$ 15,588,685
2. Due to Assets	7,920,247	136,045	7,784,202
3. Total	**$ 23,508,932**	**$ 136,045**	**$ 23,372,886**

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ 6,516,020	$ -	$ 6,516,020
2. Assumption Changes	9,072,664	-	9,072,664
3. Net Difference between projected and actual earnings on pension plan investments	7,920,247	136,045	7,784,202
4. Total	**$ 23,508,932**	**$ 136,045**	**$ 23,372,886**

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows of Resources
1. Differences between expected and actual experience	$ 14,881,035	$ -	$ 14,881,035
2. Assumption Changes	19,458,832	-	19,458,832
3. Net Difference between projected and actual earnings on pension plan investments	23,930,419	272,090	23,658,329
4. Total	**$ 58,270,286**	**$ 272,090**	**$ 57,998,196**

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

Year Ending June 30	Net Deferred Outflows of Resources
2018	$ 23,372,886
2019	22,740,007
2020	11,295,853
2021	589,450
2022	-
Thereafter	-
Total	**$ 57,998,196**

STATEMENT OF FIDUCIARY NET POSITION AS OF DECEMBER 31, 2016

Assets	
Cash and Deposits	$ 5,401,356
Receivables	
Accounts Receivable - Sale of Investments	$ -
Accrued Interest and Other Dividends	362,115
Contributions	1,055,944
Accounts Receivable - Other	1,689,946
Total Receivables	$ 3,108,005
Investments	
Fixed Income	91,747,895
Domestic Equities	184,646,891
International Equities	55,840,201
Real Estate	17,961,142
Other	25,610,413
Total Investments	$ 375,806,542
Total Assets	$ 384,315,903
Liabilities	
Payables	
Accounts Payable	$ 832,374
Accrued Expenses	310,591
Other	-
Total Liabilities	$ 1,142,965
Net Position Restricted for Pensions	$ 383,172,938

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR YEAR ENDED DECEMBER 31, 2016

Additions	
Contributions	
Employer	$ 7,166,351
Employee	4,929,842
Other	-
Total Contributions	$ 12,096,193
Investment Income	
Net Appreciation in Fair Value of Investments	$ 21,960,783
Interest and Dividends	4,755,872
Less Investment Expense	(1,003,713)
Net Investment Income	$ 25,712,942
Other	$ -
Total Additions	$ 37,809,135
Deductions	
Benefit Payments, including Refunds of Employee Contributions	$ 29,360,462
Pension Plan Administrative Expense	542,277
Other	-
Total Deductions	$ 29,902,739
Net Increase in Net Position	$ 7,906,396
Net Position Restricted for Pensions	
Beginning of Year	$ 375,266,542
End of Year	$ 383,172,938

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF CHANGES IN THE EMPLOYERS' NET PENSION LIABILITY AND RELATED RATIOS
ULTIMATELY 10 FISCAL YEARS WILL BE DISPLAYED

Measurement Date - December 31,	2016	2015	2014
Total Pension Liability			
Service Cost	$ 8,588,314	$ 7,482,069	$ 7,794,219
Interest on the Total Pension Liability	32,676,161	29,375,231	28,440,421
Benefit Changes	114,084	-	-
Difference between Expected and Actual Experience	7,264,098	16,663,107	2,978,624
Assumption/Method Changes	1,551,086	35,683,769	-
Benefit Payments	(29,338,856)	(32,070,933)	(21,079,038)
Refunds	(21,606)	(11,369)	(24,749)
Net Change in Total Pension Liability	**$ 20,833,281**	**$ 57,121,874**	**18,109,477**
Total Pension Liability - Beginning	**$461,091,743**	**$403,969,869**	**385,860,392**
Total Pension Liability - Ending (a)	**$481,925,024**	**$461,091,743**	**$ 403,969,869**
Plan Fiduciary Net Position			
Employer Contributions	$ 7,166,351	$ 5,630,297	$ 6,331,848
Employee Contributions	4,929,842	4,557,165	4,563,692
Pension Plan Net Investment Income	25,712,942	(9,083,712)	29,390,902
Benefit Payments	(29,338,856)	(32,070,933)	(21,079,038)
Refunds	(21,606)	(11,369)	(24,749)
Pension Plan Administrative Expense	(542,277)	(581,364)	(523,607)
Other	-	-	(15,065)
Net Change in Plan Fiduciary Net Position	**7,906,396**	**(31,559,916)**	**18,643,983**
Plan Fiduciary Net Position - Beginning	**375,266,542**	**406,826,458**	**388,182,475**
Plan Fiduciary Net Position - Ending (b)	**$383,172,938**	**$375,266,542**	**$ 406,826,458**
Net Pension Liability - Ending (a) - (b)	**$ 98,752,086**	**$ 85,825,201**	**(2,856,589)**
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**79.51 %**	**81.39 %**	**100.71 %**
Covered-Employee Payroll #	**$ 38,129,771**	**$ 36,827,593**	**$ 35,710,964**
Net Pension Liability as a Percentage of Covered-Employee Payroll	**258.99 %**	**233.05 %**	**(8.00)%**
Notes to Schedule:	**N/A**	**N/A**	**N/A**

 # Reported rates of pay adjusted by gross-up factors to estimate covered payroll.

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF THE EMPLOYERS' NET PENSION LIABILITY
ULTIMATELY 10 FISCAL YEARS WILL BE DISPLAYED

FY Ending December 31,	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	$ 403,969,869	$ 406,826,458	$ (2,856,589)	100.71%	$ 35,710,964	(8.00)%
2015	461,091,743	375,266,542	85,825,201	81.39%	36,827,593	233.05 %
2016	481,925,024	383,172,938	98,752,086	79.51%	38,129,771	258.99 %

 # Reported rates of pay adjusted by gross-up factors to estimate covered payroll.

SCHEDULE OF CONTRIBUTIONS
ULTIMATELY 10 FISCAL YEARS WILL BE DISPLAYED

FY Ending December 31,	Actuarially Determined Contribution	Actual Contribution*	Contribution Deficiency (Excess)	Covered Payroll #	Actual Contribution as a % of Covered Payroll
2014	$ 6,331,848	$ 6,331,848	$ -	$ 35,710,964	17.73%
2015	$ 5,630,297	$ 5,630,297	$ -	$ 36,827,593	15.29%
2016	$ 7,166,351	$ 7,166,351	$ -	$ 38,129,771	18.79%

Reported rates of pay adjusted by gross-up factors to estimate covered payroll.

* *Actual contributions are based on covered payroll at the time of the contribution. Since it was reported to the actuary that the City's practice is to contribute the percent-of-payroll employer contribution rate shown in the actuarial valuation report, the annual required contributions shown in the Schedule of Employer Contributions are the actual contributions made by the City in the fiscal year.*

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	December 31, 2016
Notes:	Actuarially determined contribution rates are calculated as of December 31, which is six months prior to the beginning of the fiscal year in which contributions are reported.

Methods and Assumptions Used to Determine Contribution Rates:

Actuarial Cost Method	Individual Entry Age
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	29 years per City Commission
Asset Valuation Method	5-year smoothed market
Inflation	3.25% wage inflation, 2.50% price inflation
Salary Increases	3.25% to 20.25% including inflation
Investment Rate of Return	7.25% as of December 31, 2016.
Cost-of-Living Adjustments:	Ad hoc "13th check" tied to plan investments for benefit recipients who do not have an automatic benefit increase. 1.5% simple escalator for firefighters retired on or after July 1, 2007 with commencement delayed 2 years after retirement. 1.5% simple escalator for Fire Chief retired on or after January 1, 2016 with commencement delayed 2 years after retirement. 1.0% simple escalator for police command officer retired on or after February 19, 2010 with commencement delayed 5 years after retirement. 1.0% simple escalator for police officers and sergeants retired on or after December 17, 2008 with commencement delayed 5 years after retirement. 1.0% simple escalator for Police Chief and Deputy Police Chief retired on or after January 1, 2016 with commencement delayed 5 years after retirement.
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition.
Mortality	RP-2014 Healthy Annuitant Mortality Table projected to 2019 using the MP-2014 Mortality Improvement Scale as of December 31, 2015. Prior to that, 1983 Group Annuity Male and Female Mortality Tables set back 3 years for males and 2 years for females.

Other Information:

Notes	The wage inflation assumptions were updated for the December 31, 2016 valuation.

SECTION D

NOTES TO FINANCIAL STATEMENTS

LONG-TERM EXPECTED RETURN ON PLAN ASSETS

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges 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.

Based on information provided by System's Investment Advisor, we used capital market expectations for each major asset class that is included in the plan's current asset allocation as of June 30, 2016; the best estimates for the long-term expected return are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
U.S. Equity	22.50%	7.95%
Non-U.S. Equity	22.50%	8.46%
Core Fixed Income	25.00%	3.78%
U.S. TIPS	10.00%	3.13%
Real Estate	5.00%	6.85%
Private Equity	5.00%	13.18%
Commodities	5.00%	4.63%
MLPs	5.00%	10.45%
Cash	0.00%	1.56%
Total	100.00%	
Total Real Rate of Return		4.75%
Plus: Price Inflation - Actuary's Assumption		2.50%
Less: Admin and Investment Expenses		0.00%
Net Expected Return		7.25%

The System's Investment Advisor projects the above portfolio to achieve a 7.30% long-term investment return.

Single Discount Rate

A single discount rate of 7.250% 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 7.250%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. 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 7.250%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 100 basis points lower or 100 basis points higher.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

	100 Basis Point Decrease	Current Single Discount Rate Assumption	100 Basis Point Increase
	6.25%	**7.25%**	**8.25%**
Total Pension Liability	$ 538,305,947	$ 481,925,024	$ 435,337,626
Plan Net Position	383,172,938	383,172,938	383,172,938
Net Pension Liability	$ 155,133,009	$ 98,752,086	$ 52,164,688

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	673
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	32
Active Plan Members	485
Total Plan Members	1,190

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF BENEFIT PROVISIONS EVALUATED DECEMBER 31, 2016

Voluntary Retirement. Police members may retire after attaining age 50 and completing 10 years of service. Firefighter members are eligible for retirement after attaining age 55 with 10 or more years of service. Firefighter members may also retire at the age their service reaches the service credit limit.

Compulsory Retirement. None.

Final Average Salary (FAS). The average of member's highest annual salary rates during the 3 consecutive calendar years of credited service when such compensation rates are the highest increased by the applicable FAS Adjustment Factor (11.6% for Police members for the period January 1, 2016 to June 30, 2016, and 12.1% for Police members for the period July 1, 2016 to December 31, 2016, 7.8% for Firefighter members for the period January 1, 2016 to June 30, 2016, and 9.2% for Firefighter members for the period July 1, 2016 to December 31, 2016). Highest salary rates that occur in calendar years after the calendar year in which the member reaches their service credit limit will not be included in the FAS.

Benefit Multiplier Description. See page 15.

Benefit Multiplier. The member's benefit multiplier, used to compute full age and service allowance, is defined in the following table:

Benefit Multipliers and Allowance Caps for Member Groups

Covered Group	*Date of Hire*	*Benefit Multiplier*	*Allowance Cap*
Firefighters	Prior to July 1, 1992	2.5%	100%
	-or-		
	Prior to July 1, 1992	2.8%	94.5%
	July 1, 1992 to January 9, 2012	2.8%	90%
	January 10, 2012 or after	2.0%*	90%
Fire Chief	At any time	2.8%	94.5%
Police Command	Prior to July 1, 2001	2.8%	100%
	July 1, 2001 to December 19, 2011	2.8%	80%
	December 20, 2011 or after	2.0%[@]	80%
Police Chief or Deputy Police Chief	At any time	2.8%	100%
Police Officers and Sergeants	Before March 9, 1995	2.8%	100%
	March 9, 1995 to June 30, 2001	2.8%	87.5%
	July 1, 2001 to December 19, 2011	2.8%	80%
	December 20, 2011 or after	2.0%[#]	80%

***** *Firefighter members hired on or after January 10, 2012 will have a 2.0% multiplier for the first five years of employment. Members may then irrevocably elect that multiplier, or, by making higher member contributions, elect a higher multiplier for all future service (2.2%, 2.4%, 2.6%, or 2.8%).*

[@] *Police Command members hired on or after December 20, 2011 will have a 2.0% multiplier for the first five years of employment. Members may then irrevocably elect that multiplier, or, by making higher member contributions, elect a higher multiplier for all future service (2.2%, 2.4%, 2.6%, or 2.8%).*

[#] *Police Officers and Sergeants members hired on or after December 20, 2011 will have a 2.0% multiplier for the first five years of employment. Members may then irrevocably elect that multiplier, or, by making higher member contributions, elect a higher multiplier for all future service (2.2%, 2.4%, 2.6%, or 2.8%).*

Full Age and Service Allowance. Allowance, payable monthly for life to the retired member, equals the member's benefit multiplier times the member's FAS times years of credited service. In lieu of this single life-level amount form of payment, a retiring member may elect from a variety of optional forms of payment, each of which is the actuarial equivalent (same lump sum value at time of retirement) of the single life-level payment form.

Deferred Allowance. A member with 10 or more years of service who leaves covered employment before retirement is eligible to receive an allowance computed in the same manner as an age and service allowance but based upon the member's employment record to the time of leaving. Such deferred allowance commences the first day of the calendar month next following the later of the date of the member's attainment of age 50 or the date when written application therefore is received by the Board. Benefits may be actuarially reduced in accordance with the Early Retirement provision if applicable.

Early Allowance. A Firefighter member who leaves covered employment after both attaining age 50 and completing 10 years of service is eligible to receive an immediate early allowance (in lieu of a deferred allowance), computed in the same manner as a deferred allowance based upon the member's employment record to the time of early retirement, but actuarially reduced (per schedule in ordinance) to reflect the fact that the age when payments begin is younger than age 55.

Duty Disability Allowance. A member who becomes totally and permanently disabled from duty-connected causes is eligible to receive, subject to offsets, a duty disability allowance computed in the same manner as a full age and service allowance based upon the member's employment record to the time of disability with a minimum allowance before offset of 72% of FAS. The maximum allowance after offsets is 90% of final salary less amounts received from (i) Worker's Compensation, (ii) gainful employment as a law enforcement officer or firefighter, and (iii) Social Security disability income.

Non-Duty Disability Allowance. A member with 1 or more years of credited service who becomes totally and permanently disabled from other than duty-connected causes is eligible to receive a non-duty disability allowance computed in the same manner as a full age and service allowance, based upon the member's employment record to the time of disability. Minimum benefit for Police Officers is 48% of FAS if credited service is less than 20 years or 60% of FAS if credited service is 20 or more years. Minimum benefit for Police Command Officers is based on the earlier of (i) the date the member would have completed 20 (if credited service is less than 20 years) or 25 years of service (if credited service is 20 or more years) or (ii) the date the member would have reached 50 years of age. Minimum benefit for Firefighters is based on the earlier of (i) the date the member would have completed 20 (if credited service is less than 20 years) or 25 years of service (if credited service is 20 or more years) or (ii) the date the member would have reached 55 years of age. Until a member reaches the Pension System vesting requirement of 10 years of service, the benefit the member is entitled to is 50% for service years 1-5, then an additional 10% of the above formula for every year of service accrued in the System (e.g., 1-5 years of service = 50% of Non-Duty Disability Allowance, 6 years = 60%, …, 10 years = 100%).

Death-in-Service Benefits. Upon the death of a member, surviving dependents are eligible to receive the following benefits, subject to offsets for Worker's Compensation and Social Security.

(a) The widow receives an allowance equal to the Option B-100 allowance (joint and 100% survivor actuarial equivalent benefit) which would have been payable to her had the deceased member retired the day preceding the date of his death and elected Option B-100. The minimum allowance payable to the widow is 20% of the member's FAS. If the death was determined to be duty-related, the minimum allowance payable to the widow is 72% of the member's final average salary (60% for Command or Firefighters hired after June 30, 1992).

(b) Dependent children under age 18 (up to age 23 if they are continuous full-time students) each are eligible to receive an allowance of 15% of the member's FAS. If there are 4 or more dependent children, each child receives an equal share of 50% of the member's FAS.

(c) If there are neither a widow nor children, each dependent parent is eligible to receive an allowance equal to 15% of FAS.

Compensation. Compensation upon which members contribute includes base pay, longevity pay, educational increment and vacation pay, plus the following additional compensation items:

> Firefighters: Overtime pay (assumed to be 4.2% for calendars years before 2010 and actual overtime in 2010 and later), holiday pay, clothing allowance, acting assignment pay, shop pay and shift pay. In addition, up to six (6) days of unused vacation time may be converted to compensation.
>
> Police Officers and Police Command Officers: Overtime pay, comp. payoff, holiday pay, clothing allowance, acting assignment, witness fees and shift pay.

The average of the additional compensation items is used to annually adjust the FAS Adjustment Factor. In addition, compensation will not include any amount that would cause the System to be in violation of IRC Sections 401(a) (17) or 415(d).

Member Contributions. Effective July 1, 2013, member contribution rates shall be payable in accordance with the following table.

System Funding Represented As a Percentage of Valuation Assets to Actuarial Accrued Liabilities	Firefighters	Police Officers & Sergeants	Police Command
Below 100%	10.70%	9.86%	10.89%
100% - 104.999%	9.70%	8.86%	9.89%
105% - 109.999%	8.70%	7.86%	8.89%
110% - 114.999%	7.70%	6.86%	7.89%
115% - 119.999%	6.70%	5.86%	6.89%
120% - 124.999%	6.70%	5.20%	6.06%
125% - 129.999%	6.70%	4.54%	5.23%
130% - 134.999%	6.70%	3.88%	4.40%
135+%	6.70%	3.22%	3.57%

The member contribution rates used for the December 31, 2016 valuation were 10.70%, 9.86%, 10.89%, 10.20%, and 10.20% for Firefighters, Police Officers and Sergeants, Police Command Officers, Police Chief and Deputy Police Chiefs, and Fire Chief respectively.

If a member terminates employment before any allowance is payable, accumulated contributions (contributions plus regular interest) are refunded.

Employer Contributions. The City contributes the remainder amounts necessary to maintain the Retirement System in sound financial condition in accordance with its funding objectives.

Automatic Post-Retirement Benefit Increases. Post-retirement benefit increases are paid to eligible groups as described in the following table.

	Firefighters	Fire Chief	Police Officer and Sergeants	Police Command	Police Chief and Deputy Police Chief
Effective date	Retired on or after July 1, 2007	Retired on or after January 1, 2016	Retired on or after December 17, 2008	Retired on or after February 19, 2010	Retired on or after January 1, 2016
Amount of increase	1.5% of original benefit	1.5% of original benefit	1.0% of original benefit	1.0% of original benefit	1.0% of original benefit
First increase to occur	2 years after retirement	2 years after retirement	5 years after retirement	5 years after retirement	5 years after retirement

The increase is paid on January or July following the end of the delay period. Benefit recipients who are eligible for the automatic post-retirement increase do not participate in the 13th check program.

13th Check. For members not eligible for automatic post-retirement increases, one-half of net investment income over 8% which is attributable to retired life assets is distributed annually (in January) to retired members and beneficiaries who have been on the retirement rolls for 5 years in the form of a 13th check. Net investment income is based on a market value rate of return averaged over the preceding 5 plan years. The distribution is in proportion to points. An individual's points are determined by multiplying (i) the number of full years of retirement, to a maximum of 15, by (ii) the number of years, and fractions thereof, of service at retirement. Subsequent to the calculations above, the benefit so calculated for Chief of Police, Deputy Chief, Police Command Officers, Police Officers and Sergeants, Firefighter Service, and beneficiaries having had at least 10 years of service under either bargaining unit shall be increased by twenty percent.

Key Employee Incentive Program (KEIP). Participation is open to any employee of the City of Grand Rapids Police and Fire Retirement System who attains service retirement eligibility and maintains a minimum leave accrual balance of 100 hours. A regular retirement benefit is computed for the member as of his KEIP election date based upon Final Average Compensation (FAC), credited service and benefit multiplier as of this date. Monthly payments equal to 75% of the computed monthly benefit are deposited into the KEIP Reserve Account (KRA) on behalf of this member. Interest is credited monthly to this balance in the KRA at the rate of 3%, compounded annually. Employer and member contributions shall cease as of the member's KEIP election date. The members may remain in the KEIP for up to five years and then must cease participation in the KEIP. The member's monthly benefit at retirement will be the original monthly payment determined at the KEIP election date plus any applicable post-retirement benefit increases.

Eligibility. The Plan is closed to individuals hired from outside of the organization to fill the position of Fire Chief, Police Chief or Deputy Police Chief.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

VALUATION METHODS

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using the individual entry-age actuarial cost method having the following characteristics:

(i) The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the portion of the member's benefit at the time of retirement. For GASB Reporting purposes, the date of retirement is determined as the date of entry into the Key Employee Incentive Program;

(ii) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities were amortized by level (principal & interest combined) percent-of-payroll contributions over a closed period of 29 years.

Valuation Asset Method. Valuation Assets were determined using a method which phases-in each year's differences between actual and assumed investment return over a closed five-year period.

ACTUARIAL ASSUMPTIONS USED FOR THE VALUATION ADOPTED BY THE BOARD OF TRUSTEES

The actuary calculates contribution requirements and actuarial present values of the System by applying assumptions to the benefit provisions and census data information furnished, using the valuation methods described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

(i) Long-term rates of investment return to be generated by the assets of the System,
(ii) patterns of pay increases to members,
(iii) rates of mortality among members, retirants and beneficiaries,
(iv) rates of withdrawal of active members,
(v) rates of disability among members, and
(vi) the age patterns of actual retirement.

In a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - - a period of time which can be as long as a century.

Actual experience will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations).

The assumptions are established by the Board after consulting with the actuary. New assumptions were adopted for the December 31, 2015 valuation pursuant to the Experience Study dated December 7, 2015. All assumptions are based on future expectations, not market measures.

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

Service at Beginning of Year	Salary Increase Assumptions For an Individual Member		
	Merit & Seniority	Base (Economic)	Increase Next Year
1	17.00%	3.25%	20.25%
2	7.00	3.25	10.25
3	6.00	3.25	9.25
4	5.00	3.25	8.25
5	4.00	3.25	7.25
6 and over	1.00	3.25	4.25

These rates were first used for the December 31, 2016 valuation.

If the number of active members remains constant, then the total active member payroll will increase 3.25% annually, the base portion of the individual salary increase assumptions. This increasing payroll was recognized in amortizing unfunded actuarial accrued liabilities. Note that the 3.25% wage inflation assumption consists of 2.50% for price inflation and 0.75% for real wage growth.

The rate of investment return was 7.25% a year compounded yearly (net after expenses). This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time. This assumption was first used for the December 31, 2015 valuation.

The assumed real return for funding purposes is the rate of return in excess of average salary increases.

The mortality table was the RP-2014 Healthy Annuity Mortality Table projected to 2019 using the MP-2014 Mortality Improvement Scale. Related values are shown below.

Sample Ages	Value at Retirement of $1 Monthly for Life: Men	Value at Retirement of $1 Monthly for Life: Women	Future Life Expectancy (Years): Men	Future Life Expectancy (Years): Women
50	$146.94	$151.22	33.25	35.95
55	140.29	145.28	28.92	31.44
60	132.17	137.63	24.73	27.02
65	122.10	128.02	20.70	22.74
70	109.89	116.29	16.85	18.67
75	95.54	102.46	13.26	14.86
80	79.46	86.81	10.01	11.41

This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. For disabled lives the RP-2014 Disabled Retirees projected to 2019 using the MP-2014 mortality improvement scale was used. For death in service the RP-2014 Mortality Tables for employees projected to 2019 using the MP-2014 Mortality Improvement Scale was used. We assume that one-half of pre-retirement deaths are duty related and that one-half are not. The margin for future mortality improvement is the projection to 2019. This assumption was first used for the December 31, 2015 valuation.

The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

Retirement Ages	Percent	Retirement Ages	Percent
50	25%	60	50%
51	25%	61	60%
52	25%	62	70%
53	25%	63	80%
54	25%	64	90%
55	25%	65	100%
56	25%	66	100%
57	25%	67	100%
58	25%	68	100%
59	25%	69	100%
		70	100%

A Police member is eligible for retirement after both attaining age 50 and completing 10 or more years of service. Fire members are eligible after attaining age 55 with 10 or more years of service or at the age their service reaches the service credit limit. A 100% decrement pattern is applied to Firefighters once achieving 34 years of service regardless of age.

Rates of separation from active membership were as follows:

(Rates do not apply to members eligible to retire and do not include separation on account of death or disability.) This assumption measures the probabilities of members remaining in employment. These rates were first used for the December 31, 2010 valuation.

Sample Ages	% of Active Members Separating Within Next Year	
	Police	Fire
25	4.60%	2.76%
30	3.80	2.28
35	2.60	1.56
40	1.80	1.08
45	1.40	0.84
50	1.20	0.72
55	1.20	0.72
60	1.20	0.72

The rates of disability were as follows:

Sample Ages	% of Active Members Becoming Disabled Within Next Year	
	Police	Fire
20	0.12%	0.12%
25	0.12	0.12
30	0.12	0.12
35	0.27	0.27
40	0.59	0.59
45	1.05	1.05
50	1.68	1.68
55	2.51	2.51

		Duty Related	Non-Duty Related
Cause of Disability:	Male	75%	25%
	Female	75%	25%

These rates were first used for the December 31, 2015 valuation.

SUMMARY OF ASSUMPTIONS USED

DECEMBER 31, 2016

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Marriage Assumption. 90% of males and 90% of females are assumed to be married for purposes of death-in-service benefits.

Pay Increase Timing. Beginning of (Fiscal) year. Reported pays represent amounts paid to members during the year ended on the valuation date.

Decrement Timing. Decrements of all types are assumed to occur mid-year.

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

Benefit Service. Exact fractional service is used to determine the amount of benefit payable.

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

Liability Adjustments. Retirement present values were increased by 12.1% and 9.2% for police and fire, respectively, to account for the FAS Adjustment Factor.

13th Check. A 7.0% load was placed on affected liabilities for members eligible to participate in the 13th Check program.

Service Purchase. An $11.0 million liability was applied for the liability for service purchases.

Normal Form of Benefit. The assumed normal form of benefit is the straight life form.

Incidence of Contributions. Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.

New Benefit Multiplier. Benefits for new hires will be modeled using the 2.8% benefit multiplier for all future years of service until such time that they elect another benefit multiplier.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement 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 valuation discount rate is used. In years where assets are not projected to be 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) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by Bond Buyer Index) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.250%; the municipal bond rate is 3.78%; and the resulting single discount rate is 7.250%.

The tables in this section provide background for the development of the single discount rate. Note that these projections are specifically used to determine the GASB SDR and should not be interpreted as a funding projection or recommendation.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate (SDR). It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS

Year	Contributions from Current Employees	Normal Cost	Administrative Expense Contributions	UAL Contributions	Total Contributions
2017	$ 4,292,580	$ 3,746,908	$ -	$ 4,719,262	$ 12,758,750
2018	4,176,539	3,652,493	-	5,392,751	13,221,782
2019	4,025,188	3,540,244	-	6,178,610	13,744,042
2020	3,848,342	3,407,766	-	6,416,837	13,672,945
2021	3,639,577	3,276,570	-	6,625,384	13,541,532
2022	3,433,469	3,131,154	-	6,840,709	13,405,333
2023	3,242,690	2,973,313	-	7,063,033	13,279,036
2024	3,006,791	2,849,232	-	7,292,581	13,148,603
2025	2,735,594	2,760,688	-	7,529,590	13,025,872
2026	2,525,086	2,632,742	-	7,774,302	12,932,130
2027	2,324,727	2,503,860	-	8,026,966	12,855,554
2028	2,136,568	2,373,447	-	8,287,843	12,797,858
2029	1,963,969	2,243,254	-	8,557,198	12,764,421
2030	1,819,658	2,110,653	-	8,835,307	12,765,618
2031	1,709,801	1,984,810	-	9,122,454	12,817,066
2032	1,626,056	1,853,379	-	9,418,934	12,898,368
2033	1,536,047	1,715,946	-	9,725,049	12,977,042
2034	1,438,599	1,605,011	-	10,041,113	13,084,724
2035	1,340,692	1,500,113	-	10,367,450	13,208,254
2036	1,242,883	1,390,118	-	10,704,392	13,337,393
2037	1,147,582	1,283,457	-	11,052,284	13,483,324
2038	1,035,971	1,179,757	-	11,411,484	13,627,212
2039	935,368	1,100,251	-	11,782,357	13,817,976
2040	850,434	973,256	-	12,165,283	13,988,973
2041	746,786	869,731	-	12,560,655	14,177,172
2042	608,854	774,023	-	12,968,876	14,351,754
2043	435,989	717,267	-	13,390,365	14,543,622
2044	253,404	676,657	-	13,825,552	14,755,613
2045	135,020	593,655	-	11,422,273	12,150,949
2046	84,766	488,556	-	-	573,321
2047	54,825	395,087	-	-	449,912
2048	34,430	314,795	-	-	349,225
2049	14,701	217,124	-	-	231,824
2050	5,368	151,303	-	-	156,671
2051	985	111,879	-	-	112,864
2052	468	75,444	-	-	75,912
2053	201	53,047	-	-	53,248
2054	58	25,821	-	-	25,880
2055	9	2,085	-	-	2,094
2056	3	179	-	-	181
2057	0	-	-	-	0
2058	0	-	-	-	0
2059	-	-	-	-	-
2060	-	-	-	-	-
2061	-	-	-	-	-
2062	-	-	-	-	-
2063	-	-	-	-	-
2064	-	-	-	-	-
2065	-	-	-	-	-
2066	-	-	-	-	-

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION

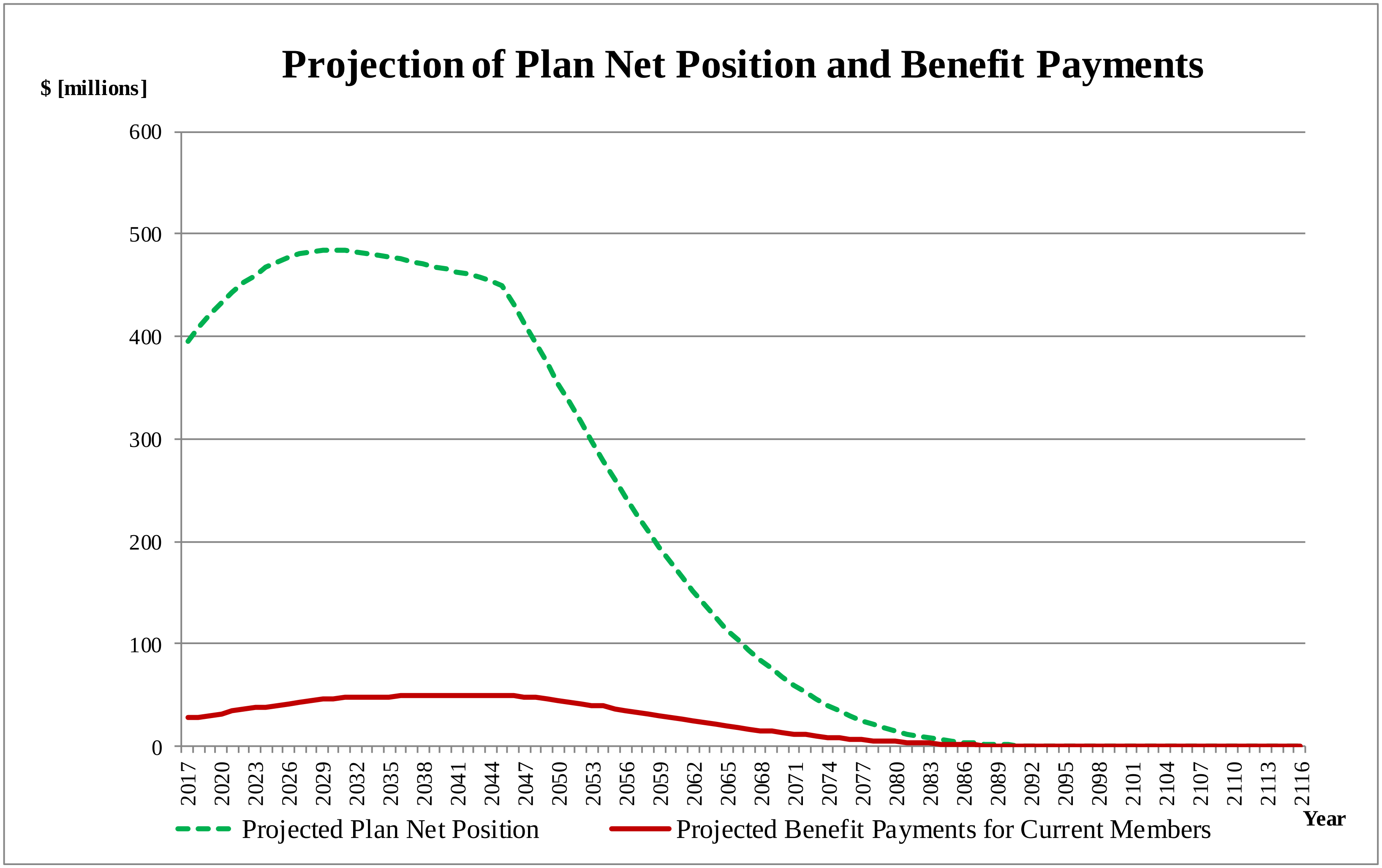
Year	Projected Beginning Plan Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.25%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2017	$ 383,172,938	$ 12,758,750	$ 27,471,868	$ 536,442	$ 27,792,461	$ 395,715,840
2018	395,715,840	13,221,782	28,659,727	554,002	28,693,566	408,417,459
2019	408,417,459	13,744,042	30,155,338	571,784	29,597,549	421,031,929
2020	421,031,929	13,672,945	31,977,276	589,445	30,462,337	432,600,490
2021	432,600,490	13,541,532	33,864,322	605,641	31,245,365	442,917,424
2022	442,917,424	13,405,333	35,524,167	620,084	31,943,819	452,122,323
2023	452,122,323	13,279,036	37,172,727	632,971	32,560,848	460,156,508
2024	460,156,508	13,148,603	38,625,176	644,219	33,098,198	467,133,915
2025	467,133,915	13,025,872	40,152,267	653,987	33,555,069	472,908,602
2026	472,908,602	12,932,130	41,748,609	662,072	33,921,625	477,351,675
2027	477,351,675	12,855,554	43,118,940	668,292	34,198,435	480,618,431
2028	480,618,431	12,797,858	44,376,392	672,866	34,393,009	482,760,040
2029	482,760,040	12,764,421	45,473,707	675,864	34,511,001	483,885,891
2030	483,885,891	12,765,618	46,516,734	677,440	34,557,096	484,014,430
2031	484,014,430	12,817,066	47,099,096	677,620	34,547,686	483,602,465
2032	483,602,465	12,898,368	47,646,656	677,043	34,500,636	482,677,769
2033	482,677,769	12,977,042	48,220,930	675,749	34,414,649	481,172,782
2034	481,172,782	13,084,724	48,386,331	673,642	34,301,375	479,498,909
2035	479,498,909	13,208,254	48,508,079	671,298	34,177,739	477,705,525
2036	477,705,525	13,337,393	48,812,250	668,788	34,038,974	475,600,854
2037	475,600,854	13,483,324	48,969,172	665,841	33,883,048	473,332,213
2038	473,332,213	13,627,212	49,280,692	662,665	33,709,425	470,725,493
2039	470,725,493	13,817,976	49,073,738	659,016	33,530,953	468,341,669
2040	468,341,669	13,988,973	49,320,372	655,678	33,352,095	465,706,687
2041	465,706,687	14,177,172	49,188,668	651,989	33,168,763	463,211,964
2042	463,211,964	14,351,754	49,488,190	648,497	32,979,953	460,406,985
2043	460,406,985	14,543,622	49,557,628	644,570	32,777,026	457,525,434
2044	457,525,434	14,755,613	49,533,508	640,536	32,572,488	454,679,492
2045	454,679,492	12,150,949	49,555,487	636,551	32,268,623	448,907,026
2046	448,907,026	573,321	49,146,324	628,470	31,444,265	431,149,819
2047	431,149,819	449,912	48,453,645	603,610	30,152,282	412,694,758
2048	412,694,758	349,225	47,602,978	577,773	28,815,164	393,678,396
2049	393,678,396	231,824	46,770,050	551,150	27,435,339	374,024,361
2050	374,024,361	156,671	45,154,236	523,634	26,037,778	354,540,940
2051	354,540,940	112,864	43,563,469	496,357	24,653,049	335,247,027
2052	335,247,027	75,912	42,008,340	469,346	23,281,300	316,126,553
2053	316,126,553	53,248	40,381,675	442,577	21,925,425	297,280,974
2054	297,280,974	25,880	38,818,382	416,193	20,587,440	278,659,718
2055	278,659,718	2,094	37,095,186	390,124	19,271,855	260,448,356
2056	260,448,356	181	35,139,279	364,628	17,995,628	242,940,259
2057	242,940,259	0	33,382,378	340,116	16,764,346	225,982,111
2058	225,982,111	0	31,619,639	316,375	15,573,921	209,620,018
2059	209,620,018	-	29,859,024	293,468	14,427,468	193,894,994
2060	193,894,994	-	28,110,514	271,453	13,327,663	178,840,690
2061	178,840,690	-	26,384,779	250,377	12,276,613	164,482,147
2062	164,482,147	-	24,692,019	230,275	11,275,806	150,835,658
2063	150,835,658	-	23,041,332	211,170	10,326,121	137,909,277
2064	137,909,277	-	21,440,455	193,073	9,427,878	125,703,627
2065	125,703,627	-	19,895,667	175,985	8,580,899	114,212,873
2066	114,212,873	-	18,411,742	159,898	7,784,583	103,425,817

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFIT PAYMENTS

Year	Projected Beginning Plan Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2017	$ 383,172,938	$ 27,471,868	$ 27,471,868	$ -	$ 26,527,085	$ -	$ 26,527,085
2018	395,715,840	28,659,727	28,659,727	-	25,803,350	-	25,803,350
2019	408,417,459	30,155,338	30,155,338	-	25,314,593	-	25,314,593
2020	421,031,929	31,977,276	31,977,276	-	25,029,427	-	25,029,427
2021	432,600,490	33,864,322	33,864,322	-	24,714,654	-	24,714,654
2022	442,917,424	35,524,167	35,524,167	-	24,173,456	-	24,173,456
2023	452,122,323	37,172,727	37,172,727	-	23,585,331	-	23,585,331
2024	460,156,508	38,625,176	38,625,176	-	22,850,237	-	22,850,237
2025	467,133,915	40,152,267	40,152,267	-	22,147,923	-	22,147,923
2026	472,908,602	41,748,609	41,748,609	-	21,471,761	-	21,471,761
2027	477,351,675	43,118,940	43,118,940	-	20,677,423	-	20,677,423
2028	480,618,431	44,376,392	44,376,392	-	19,841,890	-	19,841,890
2029	482,760,040	45,473,707	45,473,707	-	18,958,069	-	18,958,069
2030	483,885,891	46,516,734	46,516,734	-	18,081,966	-	18,081,966
2031	484,014,430	47,099,096	47,099,096	-	17,070,715	-	17,070,715
2032	483,602,465	47,646,656	47,646,656	-	16,101,794	-	16,101,794
2033	482,677,769	48,220,930	48,220,930	-	15,194,280	-	15,194,280
2034	481,172,782	48,386,331	48,386,331	-	14,215,755	-	14,215,755
2035	479,498,909	48,508,079	48,508,079	-	13,288,134	-	13,288,134
2036	477,705,525	48,812,250	48,812,250	-	12,467,560	-	12,467,560
2037	475,600,854	48,969,172	48,969,172	-	11,662,136	-	11,662,136
2038	473,332,213	49,280,692	49,280,692	-	10,942,960	-	10,942,960
2039	470,725,493	49,073,738	49,073,738	-	10,160,378	-	10,160,378
2040	468,341,669	49,320,372	49,320,372	-	9,521,158	-	9,521,158
2041	465,706,687	49,188,668	49,188,668	-	8,853,830	-	8,853,830
2042	463,211,964	49,488,190	49,488,190	-	8,305,588	-	8,305,588
2043	460,406,985	49,557,628	49,557,628	-	7,755,004	-	7,755,004
2044	457,525,434	49,533,508	49,533,508	-	7,227,254	-	7,227,254
2045	454,679,492	49,555,487	49,555,487	-	6,741,688	-	6,741,688
2046	448,907,026	49,146,324	49,146,324	-	6,234,056	-	6,234,056
2047	431,149,819	48,453,645	48,453,645	-	5,730,715	-	5,730,715
2048	412,694,758	47,602,978	47,602,978	-	5,249,515	-	5,249,515
2049	393,678,396	46,770,050	46,770,050	-	4,809,009	-	4,809,009
2050	374,024,361	45,154,236	45,154,236	-	4,329,013	-	4,329,013
2051	354,540,940	43,563,469	43,563,469	-	3,894,176	-	3,894,176
2052	335,247,027	42,008,340	42,008,340	-	3,501,316	-	3,501,316
2053	316,126,553	40,381,675	40,381,675	-	3,138,216	-	3,138,216
2054	297,280,974	38,818,382	38,818,382	-	2,812,799	-	2,812,799
2055	278,659,718	37,095,186	37,095,186	-	2,506,233	-	2,506,233
2056	260,448,356	35,139,279	35,139,279	-	2,213,602	-	2,213,602
2057	242,940,259	33,382,378	33,382,378	-	1,960,770	-	1,960,770
2058	225,982,111	31,619,639	31,619,639	-	1,731,685	-	1,731,685
2059	209,620,018	29,859,024	29,859,024	-	1,524,721	-	1,524,721
2060	193,894,994	28,110,514	28,110,514	-	1,338,401	-	1,338,401
2061	178,840,690	26,384,779	26,384,779	-	1,171,315	-	1,171,315
2062	164,482,147	24,692,019	24,692,019	-	1,022,067	-	1,022,067
2063	150,835,658	23,041,332	23,041,332	-	889,269	-	889,269
2064	137,909,277	21,440,455	21,440,455	-	771,547	-	771,547
2065	125,703,627	19,895,667	19,895,667	-	667,559	-	667,559
2066	114,212,873	18,411,742	18,411,742	-	576,008	-	576,008

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFIT PAYMENTS
(CONCLUDED)

Year	Projected Beginning Plan Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2067	$ 103,425,817	$ 16,992,014	$ 16,992,014	$ -	$ 495,657	$ -	$ 495,657
2068	93,326,991	15,638,478	15,638,478	-	425,337	-	425,337
2069	83,897,743	14,351,959	14,351,959	-	363,959	-	363,959
2070	75,117,214	13,132,327	13,132,327	-	310,518	-	310,518
2071	66,963,168	11,978,681	11,978,681	-	264,093	-	264,093
2072	59,412,686	10,889,527	10,889,527	-	223,851	-	223,851
2073	52,442,741	9,862,949	9,862,949	-	189,042	-	189,042
2074	46,030,615	8,896,763	8,896,763	-	158,996	-	158,996
2075	40,154,206	7,988,696	7,988,696	-	133,117	-	133,117
2076	34,792,167	7,136,556	7,136,556	-	110,879	-	110,879
2077	29,923,870	6,338,381	6,338,381	-	91,821	-	91,821
2078	25,529,223	5,592,557	5,592,557	-	75,540	-	75,540
2079	21,588,352	4,897,880	4,897,880	-	61,685	-	61,685
2080	18,081,186	4,253,592	4,253,592	-	49,949	-	49,949
2081	14,986,986	3,659,393	3,659,393	-	40,067	-	40,067
2082	12,283,817	3,115,392	3,115,392	-	31,805	-	31,805
2083	9,948,045	2,621,907	2,621,907	-	24,957	-	24,957
2084	7,953,990	2,179,149	2,179,149	-	19,341	-	19,341
2085	6,273,893	1,786,917	1,786,917	-	14,787	-	14,787
2086	4,878,191	1,444,334	1,444,334	-	11,144	-	11,144
2087	3,736,085	1,149,687	1,149,687	-	8,271	-	8,271
2088	2,816,317	900,422	900,422	-	6,040	-	6,040
2089	2,088,008	693,229	693,229	-	4,336	-	4,336
2090	1,521,470	524,185	524,185	-	3,057	-	3,057
2091	1,088,922	388,964	388,964	-	2,115	-	2,115
2092	765,051	283,029	283,029	-	1,435	-	1,435
2093	527,409	201,827	201,827	-	954	-	954
2094	356,631	140,976	140,976	-	621	-	621
2095	236,489	96,427	96,427	-	396	-	396
2096	153,774	64,575	64,575	-	247	-	247
2097	98,047	42,340	42,340	-	151	-	151
2098	61,308	27,183	27,183	-	91	-	91
2099	37,601	17,093	17,093	-	53	-	53
2100	22,626	10,529	10,529	-	30	-	30
2101	13,362	6,357	6,357	-	17	-	17
2102	7,748	3,763	3,763	-	9	-	9
2103	4,412	2,186	2,186	-	5	-	5
2104	2,469	1,246	1,246	-	3	-	3
2105	1,357	698	698	-	1	-	1
2106	733	384	384	-	1	-	1
2107	388	208	208	-	0	-	0
2108	202	110	110	-	0	-	0
2109	102	57	57	-	0	-	0
2110	50	29	29	-	0	-	0
2111	24	14	14	-	0	-	0
2112	11	7	7	-	0	-	0
2113	5	3	3	-	0	-	0
2114	2	1	1	-	0	-	0
2115	1	1	1	-	0	-	0
2116	0	0	0	-	0	-	0
				Totals	**$ 547,881,769**	**$ -**	**$ 547,881,769**


Projection of Plan Net Position and Benefit Payments
$ [millions]
600
500
400
300
200
100
0
2017
2020
2023
2026
2029
2032
2035
2038
2041
2044
2047
2050
2053
2056
2059
2062
2065
2068
2071
2074
2077
2080
2083
2086
2089
2092
2095
2098
2101
2104
2107
2110
2113
2116
Year
Projected Plan Net Position
Projected Benefit Payments for Current Members

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

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.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
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 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 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.
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.

GLOSSARY OF TERMS

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
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).
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 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 valuation report.
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.
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.

GLOSSARY OF TERMS

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.
GASB	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the assets of the trust.
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. 67, 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.
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 statement 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.

GLOSSARY OF TERMS

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 post-employment 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 valuation assets.

Valuation Assets The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.