The Police and Fire Retirement System of the City of Detroit

GASB Statement Nos. 67 and 68 Accounting and Financial Reporting for Pension Plans of Component II

June 30, 2018

GRS Retirement Consulting

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October 17, 2018

Board of Trustees
The Police and Fire Retirement System
of the City of Detroit

Dear Board Members:

This report provides information required for the Police and Fire Retirement System of the City of Detroit in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans" and No. 68 "Employer Reporting for Pension Plans." These calculations have been made on a basis that is consistent with our understanding of these Statements. This information is subject to review of the City's and the System's Auditor. Please let us know if the City's or the System's Auditor recommends any changes. This report covers the Police and Fire Retirement System Plan known as Component II (also known as the Legacy Plan). Since Component I is a separate plan, it is detailed in a separate report.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying 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 Nos. 67 and 68 may produce significantly different results. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by System staff, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This report is based on the valuation date of June 30, 2017. The total pension liability was rolled-forward from the valuation date to the plan year ending June 30, 2018 using generally accepted actuarial principles. The asset information as of June 30, 2018 was provided by the System. This information was checked for internal consistency, but it was not audited by GRS. A description of the adjustments made to the data is included in this report (either directly or by reference). GRS is not responsible for the accuracy of the member or financial data. As discussed in the June 30, 2017 funding valuation report, certain data was not available in time to produce the results in that report and it was necessary for us to use approximations. Please see the related discussion in the Comments section as well as the Data section of that report.

At the direction of the System and with approval of the System's Auditor, the long-term expected return on assets used to determine the discount rate is 7.19% as of June 30, 2018, up from 7.17% as of June 30, 2017. We have reviewed this assumption based on the System's asset allocation and have determined it is not unreasonable for purposes of the measurement being taken.

The benefit provisions reflected in this valuation for the development of the end of year Total Pension Liability (TPL) are those in effect for Component II as of the end of the plan year on June 30, 2018. There were no changes in benefit provisions since the June 30, 2017 GASB Statement Nos. 67 and 68 valuations.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the System on the measurement date for purposes of GASB Statement Nos. 67 and 68 reporting. 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.

David T. Kausch and Judith A. Kermans 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,

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2018

Actuarial Valuation Date	June 30, 2017
Measurement Date of the Net Pension Liability	June 30, 2018
Employer's Fiscal Year Ending Date (GASB No. 68 Reporting Date)	June 30, 2018
Membership	
Number of	
- Retirees and Beneficiaries	8,187
- DROP Members	683
- Inactive, Nonretired Members	424
- Active Members	1,914
- Total	11,208
Covered Payroll	$ 116,288,356
Net Pension Liability	
Total Pension Liability	$ 3,725,455,416
Plan Fiduciary Net Position	2,866,303,805
Net Pension Liability	$ 859,151,611
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	76.94%
Net Pension Liability as a Percentage of Covered Payroll	738.81%
Development of the Single Discount Rate	
Single Discount Rate	7.19%
Long-Term Expected Rate of Investment Return	7.19%
Long-Term Municipal Bond Rate*	3.62%
Last year ending June 30 in the 2019 to 2118 projection period for which projected benefit payments are fully funded	2118
Total Pension Expense	$ 58,125,080

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	$ -	$ -
Changes in assumptions	-	-
Net difference between projected and actual earnings on pension plan investments	102,754,253	80,734,896
Total	$ 102,754,253	$ 80,734,896

**Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 29, 2018. 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

Changes to the Actuarial Assumptions

For purposes of determining the total pension liability as of June 30, 2018, the following actuarial assumptions were changed/modified from those used in the June 30, 2017 funding valuation:

- At the direction of the System and approval of the Systems' Auditor, the long-term expected return on assets was 7.19% as of June 30, 2018 (it was 6.75% in the June 30, 2017 funding valuation, as required by the Plan of Adjustment).
- The excess of the Annuity Reserve Fund (ARF) over the related accrued liabilities was not included as a liability in this report (see page 7).
- The June 30, 2017 funding valuation included approximately $4.0 million in liabilities to account for an anticipated excess ASF earnings transfer to Component I expected to occur as a result of return on assets in the 2017 fiscal year. We have discussed this additional liability with the Plan's auditors, who have indicated that the excess earnings transfer should not be included as a liability in the GASB 67 and 68 reports until it actually occurs. As such, the excess earnings transfer is not included as a liability in this report. Please see the funding valuation report for more information.

The following actuarial assumptions were changed/modified from those used in the June 30, 2017 GASB Statement Nos. 67 and 68 valuations.

- The Single Discount Rate (SDR) changed to 7.19% from 7.17%, which was used in the June 30, 2017 GASB Statement Nos. 67 and 68 valuations. We believe the assumption is not unreasonable. However, it's important to note that an upward movement of this assumption is not consistent with the industry trend.
- New estimates of the 2014 frozen AFC for active members were provided for the June 30, 2017 funding valuation. We have used these new estimates and removed the AFC load that was used in the prior valuation. However, the new AFC estimates appeared to be unreasonably small for a portion of the population. Therefore, in cases where the new AFC estimates were less than 75% of the AFC reported for the 2014 valuation, the AFC as reported in the 2014 valuation was used. Please see pages 22-23 of the June 30, 2017 actuarial valuation of the Legacy Plan for more details on data, assumptions and approximations used in that valuation.

Changes to the Benefit Provisions

There were no changes in benefit provisions.

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 Police and Fire Retirement System of the City of Detroit subsequent to the measurement date of June 30, 2017.

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.

Discussion

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 of resources and inflows of resources related to pensions.

Both GASB Statements, No. 67 and No. 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 the types of benefits provided by the plan, as well as automatic or ad hoc COLAs;
- the number and classes of employees covered by the benefit terms;
- for the current year, sources of changes in the net pension liability;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the Single Discount Rate;
- certain information about mortality assumptions and the dates of experience studies;
- the date of the valuation used to determine the total pension liability;
- information about changes of assumptions or other inputs and benefit terms;
- the basis for determining contributions to the plan, including a description of the plan's funding policy, as well as member and employer contribution requirements;
- the total pension liability, 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;
- a description of the system that administers the pension plan; and
- a description of the terms of the plan's Deferred Retirement Option Program (DROP) and the total DROP balance for those members currently participating in the DROP. ***Current DROP balances for members of this plan are not available and are not included. These balances are also excluded from the reported assets.***

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;
- the pension plan's investment policies;
- the portion of present value of benefits to be provided through the pension plan to current active and inactive plan members;
- a description of how fair value is determined; and
- 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.

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.

While the first two tables may be built prospectively as the information becomes available, sufficient information may currently be available for the third table from prior financial statements.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. For the employer's financial reporting purposes, the net pension liability and pension expense should be measured as of the employer's "measurement date" which may not be earlier than the employer's prior fiscal year-end date. 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 June 30, 2017 rolled-forward to the plan year end of June 30, 2018.

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 7.19%; the municipal bond rate is 3.62% (based on the "20-Year Municipal GO AA Index" from the Fidelity Index); and the resulting Single Discount Rate is 7.19% as of June 30, 2018.

The projection of contributions used to determine this Single Discount Rate reflect that plan member contributions ceased prior to June 30, 2017 and that employer contributions will be made at rates equal to those set by the final Plan of Adjustment through June 30, 2023 and a 30-year closed level dollar amortization thereafter. 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.

Discussion

Therefore, the long-term expected rate of return on pension plan investments of 7.19% was applied to all periods of projected benefit payments to determine the total pension liability. Note projections are shown with a 7.19% investment return (the current long-term expected rate provided by the Retirement System).

Note the projections show assets continuing to grow after the satisfaction of liabilities. This is a byproduct of the way in which the Contingency Reserve (the excess of ARF over annuity liabilities) is handled in the valuation. See Contingency Reserve comment for additional details.

The 30-year period, beginning July 1, 2023, was chosen to illustrate the projection of net plan position due to its use in the City's 40-year forecasting included in the Plan of Adjustment, the State requirements under the Michigan Constitution, and the Public Employees Retirement System Investment Act (PERSIA). There have been a number of changes resulting from the Bankruptcy and the Board is in the process of establishing a funding policy. The amortization method used in the projections is unchanged from the June 30, 2017 GASB Statement Nos. 67 and 68 reports.

Limitation of Assets as a Percent of Total Pension Liability Measurements

This report includes a measure of the plan fiduciary net position as a percent of total pension liability (76.94% as of June 30, 2018). Unless otherwise indicated, with regard to any such measurements presented in this report:

(1) This measurement is not intended to be a funded ratio or a measure of funded progress.
(2) This measurement is inappropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations.
(3) The measurement is inappropriate for assessing the need for or amount of future employer contributions.

Limitations of Project Scope

Actuarial Standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entities to make required contributions when due. Such an evaluation was not within the scope of this project and is not within our area of expertise. Consequently, we have not made such an evaluation.

Plan

The Police and Fire Retirement System has two components. It is our understanding that Component I and Component II are separate plans and the assets from one plan cannot be used to satisfy the liabilities of the other, even though assets may be pooled for investment purposes and transfers may be required by the plan document in certain circumstances. Therefore, this report only includes the liabilities and reported assets of Component II. The liabilities and reported assets of Component I will be detailed in a separate report.

Discussion

Contingency Reserve

Historically, the Retirement Board has included a contingency reserve in the development of the accrued liabilities equal to the difference between the annuity liabilities and the Annuity Reserve Fund (when the Annuity Reserve Fund exceeds the annuity liabilities). Neither GASB Statements No. 67 nor 68 seem to address this situation directly. However, question 23 of the GASB Statement No. 67 implementation guide addresses a closely related issue. Based on that guidance, we believe the TPL should not include the Contingency Reserve and have, therefore, removed it.

The Contingency Reserve may still need to be disclosed in accordance with paragraph 30(e). If so, the amount of the reserve is $26,417,045 as of June 30, 2017. The projections in Section G show the Net Plan Position as of June 30, 2018 with and without the remaining contingency reserve. If the contingency reserve is removed from the liabilities and those assets are never to be paid out, they will continue to grow with interest.

Interest Credited to the ASF

Section C-1(20) of the Combined PFRS Plan details the method in which the ASF is credited interest. We recommend the System review the administration of the ASF interest crediting.

SECTION B

FINANCIAL STATEMENTS

This information is subject to review by the City's and the System's Auditor. Please let us know if there are any recommended changes.

Statement of Fiduciary Net Position
as of June 30, 2018

Assets		
Cash and Cash Equivalents	$	126,938,089
Receivables	$	98,187,067
Investments		
Investments at Fair Value	$	2,737,490,181
Cash and Investments held as Collateral for Securities Lending		235,392,139
Capital Assets - Net		551,830
Total Investments	$	2,973,434,150
Total Assets	$	3,198,559,306
Liabilities		
Payables		
Accounts Payable	$	332,255,501
Total Liabilities	$	332,255,501
Net Position Restricted for Pensions	$	2,866,303,805

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2018

Additions		
Contributions		
Employer	$	18,300,000
Employee		42,114
Other		-
Total Contributions	$	18,342,114
Investment Income		
Investment Income	$	234,321,369
Annuity Interest		3,353,794
Annuity Loan Interest		316,057
Net Investment Income	$	237,991,220
Other	$	1,153,145
Total Additions	$	257,486,479
Deductions		
Benefit Payments, including Refunds of Employee Contributions	$	308,390,724
Pension Plan Administrative Expense		4,933,928
Other		-
Total Deductions	$	313,324,652
Net Increase in Net Position	$	(55,838,173)
Net Position Restricted for Pensions		
Beginning of Year	$	2,922,141,978
End of Year	$	2,866,303,805

Statement of Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2018

A. Expense	
1. Service Cost	$ -
2. Interest on the Total Pension Liability	257,841,119
3. Current-Period Benefit Changes	-
4. Employee Contributions (made negative for addition here)	(42,114)
5. Projected Earnings on Plan Investments (made negative for addition here)	(198,983,796)
6. Pension Plan Administrative Expense	4,933,928
7. Other Changes in Plan Fiduciary Net Position	(1,153,145)
8. Recognition of Outflow (Inflow) of Resources due to Liabilities	25,699,217
9. Recognition of Outflow (Inflow) of Resources due to Assets	(30,170,129)
10. Total Pension Expense	**$ 58,125,080**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2018

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	32,674,674
2. Assumption Changes (gains) or losses	$	(6,975,457)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}*		1.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for difference between expected and actual experience of the Total Pension Liability	$	32,674,674
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(6,975,457)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	25,699,217
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension difference between expected and actual experience of the Total Pension Liability	$	-
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension Assumption Changes	$	-
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension due to Liabilities	$	-
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(39,007,424)
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	$	(7,801,485)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension due to Assets	$	(31,205,939)

* *We used a 1-year period (immediate recognition), since the Plan is closed and no benefits are accruing and, therefore, future participation service is zero.*

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2018

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	$ 32,674,674	$ 6,975,457	$ 25,699,217
2. Due to Assets	61,957,042	92,127,171	(30,170,129)
3. Total	$ 94,631,716	$ 99,102,628	$ (4,470,912)

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	$ 32,674,674	$ -	$ 32,674,674
2. Assumption Changes	-	6,975,457	(6,975,457)
3. Net Difference between projected and actual earnings on pension plan investments	61,957,042	92,127,171	(30,170,129)
4. Total	$ 94,631,716	$ 99,102,628	$ (4,470,912)

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	$ -	$ -	$ -
2. Assumption Changes	-	-	-
3. Net Difference between projected and actual earnings on pension plan investments	102,754,253	80,734,896	22,019,357
4. Total	$ 102,754,253	$ 80,734,896	$ 22,019,357

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
2019	$ 37,645,903
2020	16,486,076
2021	(24,311,138)
2022	(7,801,484)
2023	-
Thereafter	-
Total	$ 22,019,357

Recognition of Deferred Outflows and Inflows of Resources
Fiscal Year Ended June 30, 2018

Year Established	Initial Amount	Initial Recognition Period	Current Year Recognition	Remaining Recognition	Remaining Recognition Period
Deferred Outflow (Inflow) due to Differences Between Expected and Actual Experience on Liabilities					
2014	$ 0	1.4402	$ 0	$ 0	0.0000
2015	(59,621,651)	1.0000	0	0	0.0000
2016	45,955,554	1.0000	0	0	0.0000
2017	(10,648,606)	1.0000	0	0	0.0000
2018	32,674,674	1.0000	32,674,674	0	0.0000
Total			**$ 32,674,674**	**$ 0**	
Deferred Outflow (Inflow) due to Assumption Changes					
2014	$ 540,356,835	1.4402	$ 0	$ 0	0.0000
2015	(95,014,469)	1.0000	0	0	0.0000
2016	114,463,362	1.0000	0	0	0.0000
2017	(4,082,068)	1.0000	0	0	0.0000
2018	(6,975,457)	1.0000	(6,975,457)	0	0.0000
Total			**$ (6,975,457)**	**$ 0**	
Deferred Outflow (Inflow) due to Differences Between Projected and Actual Earnings on Plan Investments					
2014	$ (339,080,170)	5.0000	$ (67,816,034)	$ 0	0.0000
2015	105,799,133	5.0000	21,159,827	21,159,825	1.0000
2016	203,986,073	5.0000	40,797,215	81,594,428	2.0000
2017	(82,548,261)	5.0000	(16,509,652)	(49,528,957)	3.0000
2018	(39,007,424)	5.0000	(7,801,485)	(31,205,939)	4.0000
Total			**$ (30,170,129)**	**$ 22,019,357**	

Section C

Required Supplementary Information

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2018

A. Total pension liability		
1. Service Cost	$	-
2. Interest on the Total Pension Liability		257,841,119
3. Changes of benefit terms		-
4. Difference between expected and actual experience of the Total Pension Liability		32,674,674
5. Changes of assumptions		(6,975,457)
6. Benefit payments, including refunds of employee contributions		(308,390,724)
7. Net change in total pension liability	$	(24,850,388)
8. Total pension liability – beginning		3,750,305,804
9. Total pension liability – ending	**$**	**3,725,455,416**
B. Plan fiduciary net position		
1. Contributions – employer	$	18,300,000
2. Contributions – employee		42,114
3. Net investment income		237,991,220
4. Benefit payments, including refunds of employee contributions		(308,390,724)
5. Pension plan administrative expense		(4,933,928)
6. Other		1,153,145
7. Net change in plan fiduciary net position	$	(55,838,173)
8. Plan fiduciary net position – beginning		2,922,141,978
9. Plan fiduciary net position – ending	**$**	**2,866,303,805**
C. Net pension liability	**$**	**859,151,611**
D. Plan fiduciary net position as a percentage of the total pension liability		**76.94%**
E. Covered-employee payroll	**$**	**116,288,356**
F. Net pension liability as a percentage of covered-employee payroll		**738.81%**

A Special Funding Situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability shown here has not been adjusted for any potential special funding situation. Our understanding is that the City makes all the employer contributions into the fund, even though the City may receive monies from other entities as a result of the POA.

Schedules of Required Supplementary Information
Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Ultimately 10 Fiscal Years will be Displayed

Fiscal year ending June 30,	2018	2017	2016	2015	2014
Total Pension Liability					
Service Cost	$ -	$ -	$ -	$ -	$ 34,967,708
Interest on the Total Pension Liability	257,841,119	261,449,503	264,233,822	306,063,331	304,737,368
Benefit Changes	-	-	-	(555,898,068)	(102,236,878)
Difference between Expected and Actual Experience	32,674,674	(10,648,606)	45,955,554	(59,621,651)	-
Assumption Changes*	(6,975,457)	(4,082,068)	114,463,362	(95,014,469)	540,356,835
Benefit Payments	(288,443,573)	(286,667,369)	(285,936,674)	(313,816,916)	(285,512,629)
Refunds	(19,947,151)	(19,431,502)	(18,530,489)	-	(38,027,844)
Net Change in Total Pension Liability	(24,850,388)	(59,380,042)	120,185,575	(718,287,774)	454,284,561
Total Pension Liability - Beginning	3,750,305,804	3,809,685,846	3,689,500,271	4,407,788,045	3,953,503,484
Total Pension Liability - Ending (a)	$ 3,725,455,416	$ 3,750,305,804	$ 3,809,685,846	$ 3,689,500,271	$ 4,407,788,045
Plan Fiduciary Net Position					
Employer Contributions	$ 18,300,000	$ 18,300,000	$ 37,787,744	$ 114,300,000	$ -
Employee Contributions	42,114	14,055	24,801	42,576	7,783,141
Pension Plan Net Investment Income	237,991,220	282,398,412	24,649,809	122,736,820	568,760,793
Benefit Payments	(288,443,573)	(286,667,369)	(285,936,673)	(313,816,916)	(285,512,629)
Refunds	(19,947,151)	(19,431,502)	(18,530,489)	-	(38,027,844)
Pension Plan Administrative Expense	(4,933,928)	(4,433,657)	(3,103,694)	(7,630,692)	(11,373,226)
Other	1,153,145	(18,508,411)	824,511	2,919,354	-
Net Change in Plan Fiduciary Net Position	(55,838,173)	(28,328,472)	(244,283,991)	(81,448,858)	241,630,235
Plan Fiduciary Net Position - Beginning	2,922,141,978	2,950,470,450	3,194,754,441	3,276,203,299	3,034,573,064
Plan Fiduciary Net Position - Ending (b)	$ 2,866,303,805	$ 2,922,141,978	$ 2,950,470,450	$ 3,194,754,441	$ 3,276,203,299
Net Pension Liability - Ending (a) - (b)	859,151,611	828,163,826	859,215,396	494,745,830	1,131,584,746
Plan Fiduciary Net Position as a Percentage					
of Total Pension Liability	76.94 %	77.92 %	77.45 %	86.59 %	74.33 %
Covered Employee Payroll (excluding DROP)	$ 116,288,356	$ 126,865,176	$ 134,758,956	$ 132,566,687	$ 150,176,596
Net Pension Liability as a Percentage					
of Covered Employee Payroll	738.81 %	652.79 %	637.59 %	373.21 %	753.50 %

Notes to Schedule:

* *For the fiscal years ending 2016, 2017 and 2018, the "Assumption Change" item only includes the effect of the change in the SDR. All other changes to the actuarial assumptions and methods are included in the "Difference between Expected and Actual Experience" line.*

A Special Funding Situation may occur if a non-city entity has a legal obligation to contribute directly to the Retirement System. The Net Pension Liability shown here has not been adjusted for any potential special funding situation. Our understanding is that the City makes all the employer contributions into the fund, even though the City may receive monies from other entities as a result of the POA.

Schedules of Required Supplementary Information
Schedule of the Net Pension Liability Multiyear

Ultimately 10 Fiscal Years will be Displayed

FY Ending June 30,	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	$ 4,407,788,045	$ 3,276,203,299	$ 1,131,584,746	74.33%	$ 150,176,596	753.50%
2015	3,689,500,271	3,194,754,441	494,745,830	86.59%	132,566,687	373.21%
2016	3,809,685,846	2,950,470,450	859,215,396	77.45%	134,758,956	637.59%
2017	3,750,305,804	2,922,141,978	828,163,826	77.92%	126,865,176	652.79%
2018	3,725,455,416	2,866,303,805	859,151,611	76.94%	116,288,356	738.81%

* *Covered payroll shown is the reported payroll on the actuarial valuation date (census date). Actual covered payroll paid during the year was unavailable. Covered payroll for this purpose excludes DROP member payroll.*

Schedule of Contributions Multiyear

Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution#	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2014	$ 62,954,305	$ -	$ 62,954,305	$ 186,694,166 *	0.00%
2015	N/A	114,300,000	N/A	132,566,687	86.22%
2016	N/A	37,787,744	N/A	134,758,956	28.04%
2017	N/A	18,300,000	N/A	126,865,176	14.42%
2018	N/A	18,300,000	N/A	116,288,356	15.74%

* *Includes DROP members, consistent with Plan Funding.*

\# *Beginning with FY 2015, employer contributions are set forth in the POA through 2023 and are not actuarially determined. Employer contributions will again be actuarially determined in FY 2024 and beyond.*

Notes to Schedule of Contributions

Contribution Requirement: The expected contributions for fiscal year 2015 and beyond are provided in the POA. A contribution schedule showing future contribution requirements is below.

Fiscal Year	Contribution (Millions)
2019	$ 18.3
2020	18.3
2021	18.3
2022	18.3
2023	18.3

Beginning with Fiscal Year 2024, employer contributions will be actuarially determined.

Schedule of Investment Returns

This information was not available to Gabriel, Roeder, Smith & Company for inclusion in this report.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Notes to Financial Statements

Single Discount Rate

A Single Discount Rate of 7.19% was used to measure the total pension liability as of June 30, 2018. This Single Discount Rate was based on the expected rate of return on pension plan investments of 7.19% as directed by the System and the System's Auditor. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will cease as of June 30, 2018 and that employer contributions will be made at rates equal to those set by the final Plan of Adjustment through June 30, 2023 and the System's funding policy thereafter. 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 7.19%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption#

	1% Decrease 6.19%	Current Single Discount Rate Assumption 7.19%	1% Increase 8.19%
Total Pension Liability (TPL)	$4,106,390,712	$3,725,455,416	$3,405,258,675
Net Position Restricted for Pensions	2,866,303,805	2,866,303,805	2,866,303,805
Net Pension Liability (NPL)	$1,240,086,907	$ 859,151,611	$ 538,954,870

The inclusion of discount rates shown on this required schedule does not imply the rate is reasonable (other than the current assumption).

Expected Real Returns by Asset Class

This information was not available to Gabriel, Roeder, Smith & Company for this report.

Notes to Financial Statements

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	8,187
DROP Members	683
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	424
Active Plan Members	1,914
Total Plan Members	11,208

Additional information regarding the plan population may be found in the June 30, 2017 actuarial valuation of the System.

Additional Notes

As discussed in Section G-2(f) of the Combined PFRS Plan, interest on the Annuity Savings Fund (ASF) is capped. If the actual interest rate earned on the fund exceeds the cap, the excess (that would have been payable to the ASF if not for the cap) is transferred to Component I if needed to fund transition liabilities. We have assumed no future transfers of assets to Component I in this valuation. Future transfers to Component I will be recognized as they occur. If future transfers to Component I are triggered, Component II liabilities and assets will be reduced in equal amounts.

Liabilities and reported assets for Component I are not included in this report and will be detailed in a separate report.

SECTION E

SUMMARY OF BENEFITS

Summary of Frozen Benefit Provisions

Component II Frozen Benefits

All Component II benefits are frozen as of June 30, 2014 based on service and average final compensation accrued as of that date and the provisions of the Detroit Police and Fire Retirement System as it existed on June 30, 2014 and all future cost-of-living adjustments ("COLA's") were reduced from 2.25% to 1.0125% per year. The benefits evaluated in this report are the frozen reduced benefits. Component II benefits are payable after separation from service, upon meeting the eligibility conditions of the plan as it existed on June 30, 2014, regardless of whether the individual is eligible to receive a Component I benefit at that time.

Our understanding of the June 30, 2014 plan provisions is provided below for completeness. The material below is a non-legal summary and is not intended to cover all potential situations that could occur. If there are discrepancies between the description below, and appropriate legal documents, the latter necessarily govern.

Age and Service Retirement

Eligibility - 25 years of service regardless of age. 20 years of service regardless of age for eligible DPOA and DFFA members. DFFA members must retire by age 60.

Annual Amount - An annuity equal to the actuarial equivalent of the member's accumulated contribution account plus a defined benefit, which, when added to the annuity will provide the following:

Pre-1969 Members - For all service earned up to April 5, 2011 for LSA and Fire equivalent members, and up to September 1, 2011 for DPOA and Fire equivalent members, 2.5% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation (actuarially reduced to reflect early payment).

For all service earned after April 5, 2011 for LSA and Fire equivalent members, and after September 1, 2011 for DPOA and Fire equivalent members, 2.1% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation.

1969 Plan Members - For all service earned up to April 5, 2011 for LSA and Fire equivalent members, and up to September 1, 2011 for DPOA and Fire equivalent members, 2.5% of AFC times the first 25 years of service plus 2.1% of AFC times each of the next 10 years of service.

For all service earned after April 5, 2011 for LSA and Fire equivalent members, and after September 1, 2011 for DPOA and Fire equivalent members, 2.1% of AFC times each year of service, up to 35 years of service.

Members may elect to receive their accumulated contribution account in a lump sum after 25 years of service (20 years of service for eligible DPOA and DFFA members). The defined benefit at retirement is then reduced by the actuarial equivalent of the amount of principal withdrawn. No reduction is made with regard to the interest portion of the withdrawal. Pre-1969 plan members may elect 1969 plan benefits at the time of retirement.

Summary of Frozen Benefit Provisions

Type of Average Final Compensation (AFC) - Average of the current compensation for the ranks held in each of last 5 years (last 3 years for DPCOA, Executive Members and their Fire equivalents). Pension benefits for non-union employees may not be diminished due to a reduction in compensation because of fiscal emergency. AFC includes prior longevity distributions during the averaging period in accordance with the following schedule: 1% of compensation after 5 years of service, 2% after 11 years, 3% after 16 years and 4% after 21 years. A member may elect that upon retirement or upon death before retirement either (i) a lump sum payment equal to 85% (100% for DPOA and DPCOA members) of the amount of his or her unused accumulated sick leave bank, or (ii) to have the 3-year average of 25% of the value of the accumulated unused sick leave bank added to his or her AFC. Any member electing the AFC adjustment option will also be paid a lump sum equal to the remaining value of the sick leave bank as provided in (i) above. Lump sum payments are not paid by the Retirement System.

Deferred Retirement (vested benefit)

Eligibility - 10 years of service for DPOA and Fire equivalents, age 40 with 8 years of service for all others.

Annual Amount - Same as regular retirement but based on average final compensation and credited service at the time of termination.

Benefit Commencement - DPOA and Fire equivalent members hired after 6/30/85: Unreduced benefit begins at age 62. ***All other members***: Unreduced benefit begins at the age when the member would have first been eligible for regular retirement had the member continued in City service. **All** members may elect a reduced benefit payable immediately.

Note, for valuation purposes, the frozen accrued benefit was valued in the event of a death or disability. The following death and disability provisions are provided for historical purposes only.

Duty Disability Retirement

Eligibility - No age or service requirement.

Annual Amount – A basic benefit of 50% of final compensation and a supplemental benefit of 16-2/3% of final compensation is payable for 24 months. After 24 months, members disabled from any occupation continue to receive both benefits; otherwise, only the 50% benefit is then payable. Upon attaining 25 years of service, the disability benefit is 50% of final compensation. Members convert to regular retirement benefit at age 65. Worker's compensation payments are offset. Members who have already filed under the old duty disability plan will receive 66-2/3% of final compensation payable to eligibility date for regular retirement.

Non-Duty Disability Retirement

Eligibility - 5 years of service.

Annual Amount - Computed as a regular retirement benefit, but based on average final compensation and credited service at the time of disability. Minimum benefit is 20% of average final compensation.

Duty Death Before Retirement

Eligibility - No age or service requirement.

Summary of Frozen Benefit Provisions

Annual Amount - Surviving spouse receives 5/11 of police officer's or firefighter's compensation and each child under age 18 receives 1/10 of such compensation with a maximum total of 7/33 of such compensation. If there is no surviving spouse, each child receives 1/4 of such compensation with a maximum total of 1/2 of such compensation. If there is no surviving spouse or children, each dependent parent receives 1/6 of such compensation. Worker's compensation payments are offset.

Non-Duty Death Before Retirement

Eligibility - No age or service requirement.

Annual Amount - Same as a regular retirement benefit to a surviving spouse, but reduced in accordance with a 100% joint and survivor option election. Minimum benefit is 20% of average final compensation. Each child under 18 receives 1/7 of police officer's or firefighter's compensation with a maximum total of 2/7 of such compensation. If there is no spouse or children, each dependent parent receives 1/7 of such compensation.

Post-Retirement Cost-of-Living Adjustments

Pre-1969 Members - Allowances increase in proportion to active member compensation for the corresponding rank. These increases are not considered COLAs and are therefore not reduced under the POA.

1969 Plan Members - Police retired after July 1, 2001, certain Police classes retired after July 1, 1998 and all Fire members: For all service earned up to April 5, 2011 for LSA members (September 1, 2011 for DPOA members) pensions increase by 2.25% of the current pension amount each July 1. No cost-of-living adjustments for service earned after April 5, 2011 for LSA members (September 1, 2011 for DPOA members). COLA is reduced by 45% according to the POA.

Member Contributions

5% of covered compensation payable until first eligible for regular retirement. Interest on member contributions provides benefits in addition to the formula benefit.

DROP Plan

Members with 25 years (20 years for DPOA members) of service may elect to participate in the DROP. When a DROP election is made, the member ceases to accrue any further age and service retirement benefits. Seventy-five percent (75%) of the member's benefit (accrued to their DROP date) is contributed to a DROP account (a defined contribution account). At retirement the member is entitled to the balance in the DROP account and a monthly benefit equal to 100% of their benefit accrued to their DROP date, increased by any post-retirement increases that the member would have received, had the member been retired. Fire members must retire from the DROP plan at age 60. Participation in the DROP is limited to 10 years for LSA members electing to DROP after April 5, 2011.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Summary of Assumptions Used for DPFRS
Actuarial Valuation
Assumptions Adopted by Board of Trustees
After Consulting with Actuary

ASSUMPTION REVIEW

All assumptions are estimates of future experience except as noted. The rationale for the assumptions is based on experience studies unless noted otherwise.

ECONOMIC ASSUMPTIONS

For the Determination of the June 30, 2018 TPL:
The investment return rate used in the valuation was 7.19% per year, compounded annually (net after investment expenses). This assumption was provided by the Retirement System.

Price inflation is not directly used in the valuation. For purposes of assessing the reasonability of the investment return assumption we assumed price inflation of 2.50% per year.

NON-ECONOMIC ASSUMPTIONS

The mortality table used to measure retired life mortality is the RP-2014 Blue Collar Annuitant Table for males and females. Tables were extended below age 50 with a cubic spline to the published Juvenile rates. Pre-retirement mortality is the RP-2014 Blue Collar Employee Tables for males and females. The tables are projected to be fully generational, based on the 2-dimensional, sex distinct mortality improvement scale MP-2014 (which was published and intended to be used with RP-2014). This table was first used as of June 30, 2014. The rationale for the mortality assumption is based on the 2008-2013 Mortality Experience Study issued February 13, 2015.

The probabilities of age/service retirement for members eligible to retire are shown on page 25. The rationale is based on the 2002-2007 Experience Study. However, probabilities were modified effective with the June 30, 2014 valuation to reflect a change in the modeling of the future DROP members, consistent with the plan closure. The revised probabilities were selected so that, when combined with the model change, the effect on the present value of benefits would be immaterial.

The probabilities of separation from service (including death-in-service) are shown for sample ages on page 26. These probabilities were first used for the June 30, 2008 valuation. The rationale is based on the 2002-2007 Experience Study.

Data adjustments: See page 23 of the June 30, 2017 actuarial valuation issued July 30, 2018.

Single Life Retirement Values
Based on RP-2014 Blue Collar
for Males and Females

Sample Attained Ages in 2017	Future Life Expectancy (years)	
	Men	Women
45	39.48	42.84
50	34.50	37.77
55	29.71	32.85
60	25.14	28.08
65	20.80	23.48
70	16.75	19.11
75	13.05	15.08
80	9.77	11.48

Probabilities of Service Retirement

Service	Percent of Eligible Active Members Retiring within Next Year			
	Police		Fire	
	20 & Out	25 & Out	20 & Out	25 & Out
19	40%		40%	
20	40%		40%	
21	40%		40%	
22	40%		40%	
23	40%		40%	
24	100%	40%	100%	40%
25	100%	40%	100%	40%
26	100%	40%	100%	40%
27	100%	40%	100%	40%
28	100%	40%	100%	40%
29	100%	100%	100%	100%
30	100%	100%	100%	100%
31	100%	100%	100%	100%
32	100%	100%	100%	100%
33	100%	100%	100%	100%
34	100%	100%	100%	100%
35	100%	100%	100%	100%
36	100%	100%	100%	100%
37	100%	100%	100%	100%
38	100%	100%	100%	100%
39	100%	100%	100%	100%
40	100%	100%	100%	100%

Age	Percent of Eligible Active Members Retiring within Next Year	
	Police	Fire
60	40%	100%
61	40%	100%
62	40%	100%
63	40%	100%
64	40%	100%
65	100%	100%
66	100%	100%
67	100%	100%
68	100%	100%
69	100%	100%
70	100%	100%

Members eligible for 20 & Out are assumed to be first eligible for normal retirement after 19 years of service due to their ability (and experience) to purchase service. Members eligible for 25 & Out are assumed to be eligible for normal retirement after 24 years of service due to their ability (and experience) to purchase service. Members are also eligible to retire at age 60 with no service requirement. The rationale is based on the 2002-2007 Experience Study.

Probabilities of Separation

Sample Ages	Years of Service	% of Active Members Withdrawing within Next Year	
		Police	Fire
ALL	0	8.50%	5.00%
	1	7.50%	4.00%
	2	6.00%	3.00%
	3	5.00%	2.00%
	4	4.50%	2.00%
25	5 & Over	4.50%	1.96%
30		3.30%	1.62%
35		2.30%	1.11%
40		1.70%	0.77%
45		1.50%	0.60%
50		1.10%	0.51%
55		0.80%	0.51%
60		0.80%	0.51%

Sample Ages	% of Active Members Becoming Disabled within Next Year			
	Police		Fire	
	Ordinary	Duty	Ordinary	Duty
25	0.06%	0.13%	0.07%	0.34%
30	0.07%	0.19%	0.08%	0.52%
35	0.08%	0.34%	0.09%	0.90%
40	0.11%	0.49%	0.12%	1.30%
45	0.16%	0.73%	0.18%	1.92%
50	0.47%	1.16%	0.53%	3.06%
55	0.73%	1.96%	0.82%	5.18%
60	0.83%	2.82%	0.94%	7.47%

The rationale is based on the 2002-2007 Experience Study.

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. This assumption accounts for potential dependent children/dependent parent death benefits. No other assumption is made for surviving children/dependent parents. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	N/A
Decrement Timing:	Decrements 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 of decrement.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.
Incidence of Contributions:	Employer contributions are assumed to be received on the last day of the fiscal year. For purposes of determining the GASB single discount rate, all cash flows are assumed to occur mid-year.
Longevity in AFC:	Longevity payments were included directly in the AFC data provided by the System. No further adjustment was included.
Unused Sick Leave Payout:	Sick leave banks as of June 30, 2014 were included in the 2014 data file provided by the System. No further adjustment was included.
Administrative Expense:	3.0% of Component I payroll. 70% of the administrative expenses were allocated to Component II and 30% to Component I based on actual administrative expenses paid.
Post-Retirement COLA:	Active members are assumed to receive a 0.9% COLA rather than 1.0125% because the annuity portion is not subject to the COLA. Post-retirement increases for retired members were based on the plan in effect at retirement. For the pre-69 plan members, future COLA's are assumed to be the same as wage inflation for active members (not reduced in POA). For other members retiring before 2014, the COLA rate is prorated by the ratio of COLA eligible service to total service at retirement before applying the POA mandated reduction to 1.0125%. The service ratio is provided on the data file.
AFC Period:	AFC data was provided by the System for the June 30, 2014 (date of freeze) valuation.
Disability Change Age:	The duty disability benefit is assumed to change at normal retirement age.

Miscellaneous and Technical Assumptions (Concluded)

DROP Assumption:	All active members not in the DROP are assumed to have a 40% chance of retiring or entering the DROP in their first five years of retirement eligibility with a 60% chance of entering the DROP.
Workers Compensation Offset:	No Workers Compensation offsets are assumed for duty disability benefits.
DROP Account:	DROP account balances are not reported. No liability is included for DROP account balances.
Class Codes:	For valuation purposes, members are categorized as DPOA, DFFA or LSA based on class codes provided by the Retirement System and are primarily used in the valuation to determine normal retirement eligibility (20 & Out versus 25 & Out). The class codes used for this valuation were taken from the 2014 data file. Therefore, counts in the valuation may not represent actual membership in the respective associations.
Frozen Benefit Estimate:	Reported AFC was adjusted to include 25% of unused sick leave (to a maximum of 25 days per year of service).
Form of Payment:	The actuarial equivalent basis for optional forms of payment and early retirement are based on the RP-2014 Mortality Table with Blue Collar adjustments projected 11 years, a 6.75% interest rate, 90%/10% unisex mix and a 1.0125% COLA assumption per System Policy. Annuity withdrawal factors use the same mortality and interest rate assumptions with a 0% COLA assumption. No adjustment has been made for alternate forms of payment elections. Principal balances of accumulated member contributions were converted to life annuity offsets based on plan factors for the valuation.
Retiree Pop-Up Factor:	If a retiree has a pop-up option but no pop-up factor is provided in the data, the pop-up factor is determined by using an average age at retirement of 50.2, beneficiary age of 47.2, and the optional form of payment assumptions (determined above).
Member Contributions:	Member contributions to this Component II plan are assumed to have ceased with the bankruptcy. However, for purposes of determining refunds on member contributions, contribution balances are assumed to earn 5.25% interest.
Limit Testing:	We understand the System has specific outside counsel regarding I.R.C. section 415 testing. We have not adjusted liabilities for potential 415 limits.

The rationale for the miscellaneous and technical assumptions is the 2002-2007 Experience Study, modified as necessary for changes in data or administration.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate at End of Year

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 municipal bond 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 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 7.19%; the municipal bond rate is 3.62%; and the resulting SDR is 7.19% as of June 30, 2018.

The tables in this section provide background for the development of the SDR.

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). For purposes of determining the discount rate as of June 30, 2018, the employer contributions for the 10-year period ending June 30, 2023 were set by the 8th Amended Plan of Adjustment (POA). Subsequent employer contributions were determined by a closed 30-year level dollar amortization of any unfunded actuarial accrued liability (excluding the contingency reserve) using 7.19% interest, net of all expenses, consistent with the 100% funded target by 2053 in the POA and State Law.

Note that these projections are specifically used to determine the GASB discount rate and should not be interpreted as a funding projection or recommendation.

Rates of Return: The 7.19% rate of return was before administrative expenses. Therefore, the projections assumed that any administration expenses incurred by the plan will directly increase employer contributions beginning with FY 2024.

Contingency Reserve: The System maintains a contingency reserve equal to the excess (if any) of the Annuity Reserve Fund over the annuity liabilities. We believe GASB 67/68 requires this reserve to be removed from the NPL. Since there are no benefits in the projection directly related to the reserve, the result is that the reserve will continue to grow with interest, if experience is exactly as assumed. Please see comments on page 7 for additional details.

Calculation of the Single Discount Rate at End of Year

Administrative Expenses: For purposes of the projection using a 7.19% rate of return, administrative expenses were assumed to be related to Component I payroll. Payroll was increased by assumed wage inflation as of June 30, 2014 of 2.00% for 5 years, 2.50% for the next 5 years and 3.00% thereafter. Since benefits are frozen, the wage inflation assumption does not affect anything other than the administrative expenses.

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 SDR. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR. For purposes of determining the discount rate as of June 30, 2018, the benefit payments reflect the plan provisions in force as of June 30, 2018.

Unfunded Actuarial Accrued Liabilities: Actual employer contributions through June 30, 2023 are set by the POA. The amortization period and method after 2023 has not yet been established by the Board.

Single Discount Rate Development
Projection of Contributions
End of Year

Fiscal Year Ending June 30,	Projected Contributions from Current Employees	Projected Service Cost	Administrative Expense Contributions#	Projected UAL Contributions	Projected Total Contributions
2019	$ -	$ -	$ 2,585,350	$ 15,714,650	$ 18,300,000
2020	-	-	2,420,215	15,879,785	18,300,000
2021	-	-	2,300,277	15,999,723	18,300,000
2022	-	-	2,212,194	16,087,806	18,300,000
2023	-	-	2,147,612	16,152,388	18,300,000
2024	-	-	2,084,262	91,816,002	93,900,264
2025	-	-	2,013,981	91,816,002	93,829,983
2026	-	-	1,943,227	91,816,002	93,759,229
2027	-	-	1,865,243	91,816,002	93,681,245
2028	-	-	1,782,910	91,816,002	93,598,912
2029	-	-	1,701,963	91,816,002	93,517,965
2030	-	-	1,627,988	91,816,002	93,443,990
2031	-	-	1,554,945	91,816,002	93,370,947
2032	-	-	1,475,360	91,816,002	93,291,362
2033	-	-	1,394,868	91,816,002	93,210,870
2034	-	-	1,319,490	91,816,002	93,135,492
2035	-	-	1,250,464	91,816,002	93,066,466
2036	-	-	1,192,841	91,816,002	93,008,843
2037	-	-	1,140,562	91,816,002	92,956,564
2038	-	-	1,092,191	91,816,002	92,908,193
2039	-	-	1,038,518	91,816,002	92,854,520
2040	-	-	970,363	91,816,002	92,786,365
2041	-	-	889,239	91,816,002	92,705,241
2042	-	-	773,729	91,816,002	92,589,731
2043	-	-	639,667	91,816,002	92,455,669
2044	-	-	523,054	91,816,002	92,339,056
2045	-	-	416,803	91,816,002	92,232,805
2046	-	-	322,757	91,816,002	92,138,759
2047	-	-	243,962	91,816,002	92,059,964
2048	-	-	179,291	91,816,002	91,995,293
2049	-	-	127,322	91,816,002	91,943,324
2050	-	-	88,664	91,816,002	91,904,666
2051	-	-	61,425	91,816,002	91,877,427
2052	-	-	41,215	91,816,002	91,857,217
2053	-	-	26,593	91,816,002	91,842,595
2054	-	-	16,463	-	16,463
2055	-	-	9,341	-	9,341
2056	-	-	4,736	-	4,736
2057	-	-	1,952	-	1,952
2058	-	-	593	-	593
2059	-	-	48	-	48
2060	-	-	-	-	-
2061	-	-	-	-	-
2062	-	-	-	-	-
2063	-	-	-	-	-
2064	-	-	-	-	-
2065	-	-	-	-	-
2066	-	-	-	-	-
2067	-	-	-	-	-
2068	-	-	-	-	-

Expenses assumed to be paid by employer.

Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Projection of Contributions
End of Year (Concluded)

Fiscal Year Ending June 30,	Projected Contributions from Current Employees	Projected Service Cost	Administrative Expense Contributions#	Projected UAL Contributions	Projected Total Contributions
2069	$ -	$ -	$ -	$ -	$ -
2070	-	-	-	-	-
2071	-	-	-	-	-
2072	-	-	-	-	-
2073	-	-	-	-	-
2074	-	-	-	-	-
2075	-	-	-	-	-
2076	-	-	-	-	-
2077	-	-	-	-	-
2078	-	-	-	-	-
2079	-	-	-	-	-
2080	-	-	-	-	-
2081	-	-	-	-	-
2082	-	-	-	-	-
2083	-	-	-	-	-
2084	-	-	-	-	-
2085	-	-	-	-	-
2086	-	-	-	-	-
2087	-	-	-	-	-
2088	-	-	-	-	-
2089	-	-	-	-	-
2090	-	-	-	-	-
2091	-	-	-	-	-
2092	-	-	-	-	-
2093	-	-	-	-	-
2094	-	-	-	-	-
2095	-	-	-	-	-
2096	-	-	-	-	-
2097	-	-	-	-	-
2098	-	-	-	-	-
2099	-	-	-	-	-
2100	-	-	-	-	-
2101	-	-	-	-	-
2102	-	-	-	-	-
2103	-	-	-	-	-
2104	-	-	-	-	-
2105	-	-	-	-	-
2106	-	-	-	-	-
2107	-	-	-	-	-
2108	-	-	-	-	-
2109	-	-	-	-	-
2110	-	-	-	-	-
2111	-	-	-	-	-
2112	-	-	-	-	-
2113	-	-	-	-	-
2114	-	-	-	-	-
2115	-	-	-	-	-
2116	-	-	-	-	-
2117	-	-	-	-	-
2118	-	-	-	-	-

Expenses assumed to be paid by employer.

Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Projection of Plan Fiduciary Net Position
End of Year

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position Without Annuity Reserve	Projected Total Contributions	Projected Benefit Payments	Annuity Reserve Refund	Projected Administrative Expenses	Projected Investment Earnings at 7.19%	Projected Ending Plan Net Position Without Annuity Reserve	Projected Ending Plan Net Position With Annuity Reserve
	(a)	(b)	(c)	(d)	(e)	(f)	(g)=(a)+(b)-(c)-(d)-(e)+(f)	(h)
2019	$ 2,866,303,805	$ 18,300,000	$ 316,136,636	$ 26,163,293	$ 2,585,350	$ 193,593,385	$ 2,733,311,911	$ 2,761,356,345
2020	2,733,311,911	18,300,000	317,022,846	-	2,420,215	185,886,936	2,618,055,786	2,648,116,615
2021	2,618,055,786	18,300,000	316,078,812	-	2,300,277	177,637,606	2,495,614,304	2,527,836,506
2022	2,495,614,304	18,300,000	314,992,272	-	2,212,194	168,875,559	2,365,585,397	2,400,124,375
2023	2,365,585,397	18,300,000	312,972,785	-	2,147,612	159,600,102	2,228,365,102	2,265,387,433
2024	2,228,365,102	93,900,264	311,845,305	-	2,084,262	152,446,688	2,160,782,487	2,200,466,724
2025	2,160,782,487	93,829,983	309,116,344	-	2,013,981	147,683,901	2,091,166,047	2,133,703,580
2026	2,091,166,047	93,759,229	306,109,303	-	1,943,227	142,784,706	2,019,657,452	2,065,253,434
2027	2,019,657,452	93,681,245	303,079,476	-	1,865,243	137,750,270	1,946,144,249	1,995,018,582
2028	1,946,144,249	93,598,912	299,751,199	-	1,782,910	132,582,245	1,870,791,298	1,923,179,696
2029	1,870,791,298	93,517,965	295,938,786	-	1,701,963	127,299,046	1,793,967,561	1,850,122,684
2030	1,793,967,561	93,443,990	291,585,781	-	1,627,988	121,929,193	1,716,126,975	1,776,319,652
2031	1,716,126,975	93,370,947	286,846,759	-	1,554,945	116,499,866	1,637,596,084	1,702,116,615
2032	1,637,596,084	93,291,362	281,698,408	-	1,475,360	111,035,366	1,558,749,044	1,627,908,601
2033	1,558,749,044	93,210,870	276,205,649	-	1,394,868	105,560,301	1,479,919,699	1,554,051,828
2034	1,479,919,699	93,135,492	270,199,639	-	1,319,490	100,104,640	1,401,640,702	1,481,102,931
2035	1,401,640,702	93,066,466	263,877,372	-	1,250,464	94,699,720	1,324,279,053	1,409,454,615
2036	1,324,279,053	93,008,843	257,098,083	-	1,192,841	89,376,903	1,248,373,875	1,339,673,561
2037	1,248,373,875	92,956,564	249,818,266	-	1,140,562	84,176,488	1,174,548,100	1,272,412,233
2038	1,174,548,100	92,908,193	242,107,541	-	1,092,191	79,140,804	1,103,397,366	1,208,297,930
2039	1,103,397,366	92,854,520	234,118,018	-	1,038,518	74,307,305	1,035,402,656	1,147,845,570
2040	1,035,402,656	92,786,365	225,837,383	-	970,363	69,711,007	971,092,282	1,091,619,843
2041	971,092,282	92,705,241	217,258,109	-	889,239	65,390,163	911,040,338	1,040,233,830
2042	911,040,338	92,589,731	208,413,615	-	773,729	61,384,869	855,827,594	994,310,099
2043	855,827,594	92,455,669	199,319,068	-	639,667	57,736,347	806,060,875	954,500,272
2044	806,060,875	92,339,056	190,135,640	-	523,054	54,482,534	762,223,771	921,335,960
2045	762,223,771	92,232,805	180,858,593	-	416,803	51,658,367	724,839,548	895,391,903
2046	724,839,548	92,138,759	171,611,252	-	322,757	49,297,114	694,341,412	877,156,481
2047	694,341,412	92,059,964	162,477,536	-	243,962	47,426,956	671,106,834	867,066,307
2048	671,106,834	91,995,293	153,480,804	-	179,291	46,074,208	655,516,241	865,565,200
2049	655,516,241	91,943,324	144,689,642	-	127,322	45,263,802	647,906,403	873,057,882
2050	647,906,403	91,904,666	136,136,138	-	88,664	45,018,816	648,605,083	889,944,954
2051	648,605,083	91,877,427	127,860,564	-	61,425	45,361,394	657,921,915	916,614,122
2052	657,921,915	91,857,217	119,867,205	-	41,215	46,313,648	676,184,361	953,476,538
2053	676,184,361	91,842,595	112,171,024	-	26,593	47,898,593	703,727,932	1,000,957,416
2054	703,727,932	16,463	104,779,011	-	16,463	46,896,611	645,845,533	964,445,817
2055	645,845,533	9,341	97,692,207	-	9,341	42,985,215	591,138,542	932,646,186
2056	591,138,542	4,736	90,905,531	-	4,736	39,291,529	539,524,540	905,586,585
2057	539,524,540	1,952	84,410,785	-	1,952	35,809,916	490,923,671	883,305,577
2058	490,923,671	593	78,198,511	-	593	32,534,969	445,260,129	865,854,293
2059	445,260,129	48	72,259,134	-	48	29,461,575	402,462,569	853,297,454
2060	402,462,569	-	66,584,077	-	-	26,584,907	362,463,400	845,713,313
2061	362,463,400	-	61,166,046	-	-	23,900,365	325,197,718	843,193,300
2062	325,197,718	-	55,999,514	-	-	21,403,475	290,601,680	845,841,144
2063	290,601,680	-	51,081,243	-	-	19,089,763	258,610,200	853,771,381
2064	258,610,200	-	46,410,495	-	-	16,954,575	229,154,280	867,107,550
2065	229,154,280	-	41,988,852	-	-	14,992,893	202,158,321	885,980,431
2066	202,158,321	-	37,818,861	-	-	13,199,193	177,538,652	910,527,572
2067	177,538,652	-	33,902,595	-	-	11,567,385	155,203,442	940,894,266
2068	155,203,442	-	30,242,000	-	-	10,090,798	135,052,239	977,234,233

Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Projection of Plan Fiduciary Net Position
End of Year (Concluded)

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position Without Annuity Reserve	Projected Total Contributions	Projected Benefit Payments	Annuity Reserve Refund	Projected Administrative Expenses	Projected Investment Earnings at 7.19%	Projected Ending Plan Net Position Without Annuity Reserve	Projected Ending Plan Net Position With Annuity Reserve
	(a)	(b)	(c)	(d)	(e)	(f)	(g)=(a)+(b)-(c)-(d)-(e)+(f)	(h)
2069	$ 135,052,239	$ -	$ 26,838,390	$ -	$ -	$ 8,762,162	$ 116,976,011	$ 1,019,710,891
2070	116,976,011	-	23,692,412	-	-	7,573,616	100,857,215	1,068,498,733
2071	100,857,215	-	20,802,567	-	-	6,516,762	86,571,410	1,123,786,353
2072	86,571,410	-	18,164,513	-	-	5,582,804	73,989,702	1,185,780,398
2073	73,989,702	-	15,773,248	-	-	4,762,653	62,979,107	1,254,707,555
2074	62,979,107	-	13,621,240	-	-	4,047,013	53,404,881	1,330,818,604
2075	53,404,881	-	11,699,193	-	-	3,426,525	45,132,213	1,414,391,983
2076	45,132,213	-	9,995,861	-	-	2,891,892	38,028,243	1,505,737,791
2077	38,028,243	-	8,498,024	-	-	2,434,029	31,964,249	1,605,202,113
2078	31,964,249	-	7,189,752	-	-	2,044,244	26,818,741	1,713,172,407
2079	26,818,741	-	6,055,705	-	-	1,714,343	22,477,379	1,830,079,874
2080	22,477,379	-	5,081,613	-	-	1,436,610	18,832,377	1,956,401,491
2081	18,832,377	-	4,250,578	-	-	1,203,892	15,785,690	2,092,666,024
2082	15,785,690	-	3,546,835	-	-	1,009,695	13,248,551	2,239,456,580
2083	13,248,551	-	2,955,873	-	-	848,152	11,140,829	2,397,413,216
2084	11,140,829	-	2,463,961	-	-	713,984	9,390,851	2,567,236,223
2085	9,390,851	-	2,056,438	-	-	602,556	7,936,969	2,749,691,423
2086	7,936,969	-	1,720,322	-	-	509,896	6,726,543	2,945,613,142
2087	6,726,543	-	1,444,539	-	-	432,609	5,714,613	3,155,907,159
2088	5,714,613	-	1,218,278	-	-	367,844	4,864,179	3,381,555,569
2089	4,864,179	-	1,032,202	-	-	313,271	4,145,247	3,623,620,748
2090	4,145,247	-	878,311	-	-	267,016	3,533,953	3,883,249,742
2091	3,533,953	-	750,267	-	-	227,587	3,011,273	4,161,678,627
2092	3,011,273	-	642,763	-	-	193,804	2,562,314	4,460,237,851
2093	2,562,314	-	551,609	-	-	164,744	2,175,450	4,780,357,858
2094	2,175,450	-	473,581	-	-	139,685	1,841,554	5,123,575,278
2095	1,841,554	-	406,260	-	-	118,056	1,553,350	5,491,539,728
2096	1,553,350	-	347,850	-	-	99,398	1,304,898	5,886,021,296
2097	1,304,898	-	297,035	-	-	83,329	1,091,192	6,308,918,700
2098	1,091,192	-	252,783	-	-	69,527	907,936	6,762,268,242
2099	907,936	-	214,290	-	-	57,711	751,356	7,248,253,468
2100	751,356	-	180,867	-	-	47,633	618,122	7,769,215,635
2101	618,122	-	151,904	-	-	39,077	505,295	8,327,664,969
2102	505,295	-	126,873	-	-	31,849	410,271	8,926,292,726
2103	410,271	-	105,309	-	-	25,778	330,740	9,567,984,143
2104	330,740	-	86,831	-	-	20,713	264,622	10,255,832,305
2105	264,622	-	71,081	-	-	16,515	210,056	10,993,153,055
2106	210,056	-	57,730	-	-	13,064	165,390	11,783,500,991
2107	165,390	-	46,499	-	-	10,249	129,140	12,630,686,571
2108	129,140	-	37,151	-	-	7,973	99,962	13,538,794,472
2109	99,962	-	29,459	-	-	6,147	76,650	14,512,203,295
2110	76,650	-	23,200	-	-	4,692	58,141	15,555,606,692
2111	58,141	-	18,179	-	-	3,538	43,500	16,674,035,992
2112	43,500	-	14,216	-	-	2,625	31,909	17,872,884,462
2113	31,909	-	11,126	-	-	1,901	22,685	19,157,933,336
2114	22,685	-	8,737	-	-	1,322	15,271	20,535,379,698
2115	15,271	-	6,896	-	-	854	9,229	22,011,866,358
2116	9,229	-	5,476	-	-	470	4,224	23,594,513,880
2117	4,224	-	4,373	-	-	149	-	25,290,954,901
2118	-	-	-	-	-	-	-	27,109,374,558

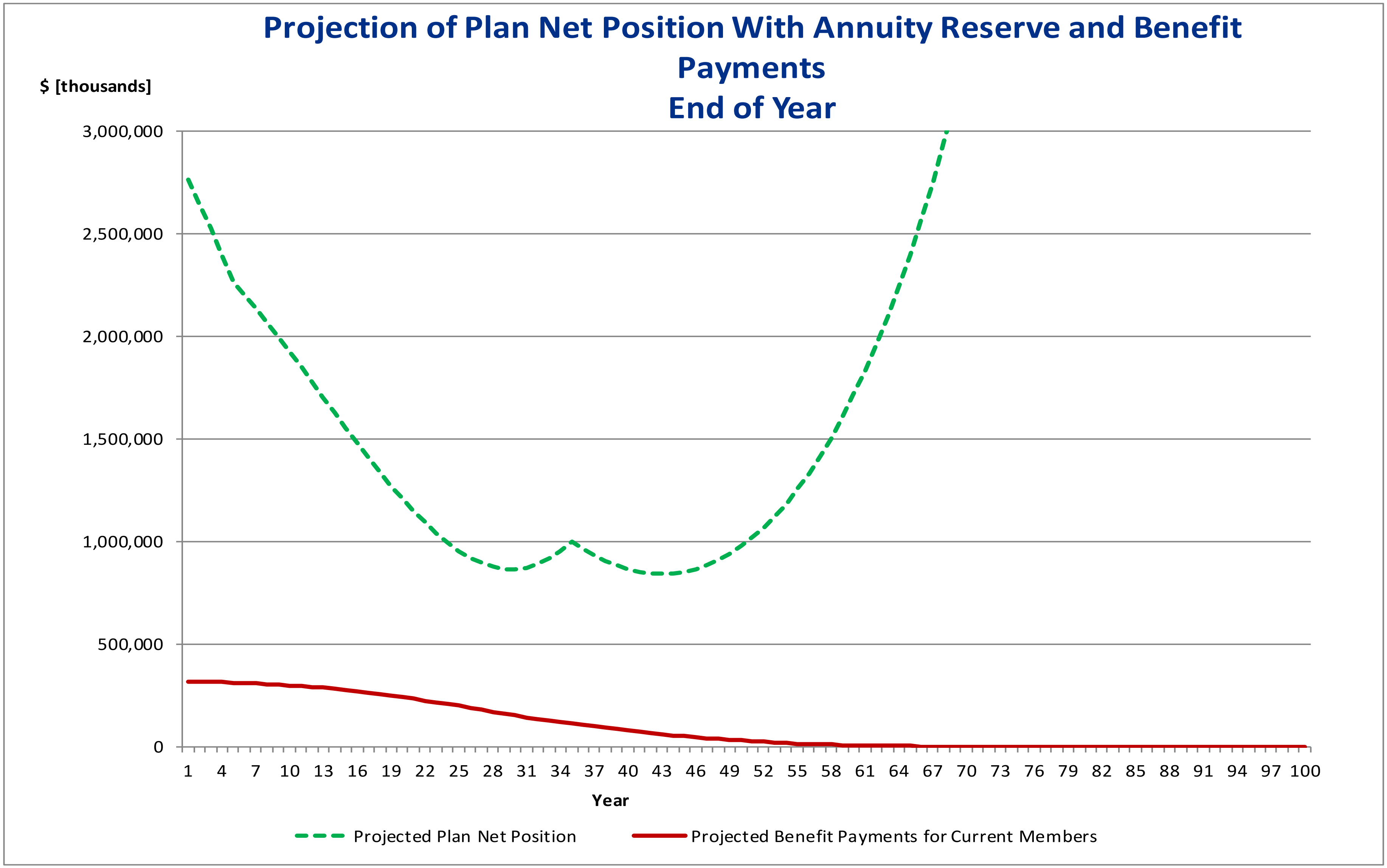
Employer contributions as shown may differ substantially from those determined by a funding valuation.

Single Discount Rate Development
Present Values of Projected Benefits
End of Year

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position With Annuity Reserve	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)
2019	$ 2,866,303,805	$ 316,136,636	$ 316,136,636	$ -	$ 305,349,837	$ -	$ 305,349,837
2020	2,761,356,345	317,022,846	317,022,846	-	285,666,395	-	285,666,395
2021	2,648,116,615	316,078,812	316,078,812	-	265,711,106	-	265,711,106
2022	2,527,836,506	314,992,272	314,992,272	-	247,035,832	-	247,035,832
2023	2,400,124,375	312,972,785	312,972,785	-	228,987,805	-	228,987,805
2024	2,265,387,433	311,845,305	311,845,305	-	212,858,364	-	212,858,364
2025	2,200,466,724	309,116,344	309,116,344	-	196,842,652	-	196,842,652
2026	2,133,703,580	306,109,303	306,109,303	-	181,852,592	-	181,852,592
2027	2,065,253,434	303,079,476	303,079,476	-	167,975,222	-	167,975,222
2028	1,995,018,582	299,751,199	299,751,199	-	154,987,030	-	154,987,030
2029	1,923,179,696	295,938,786	295,938,786	-	142,751,948	-	142,751,948
2030	1,850,122,684	291,585,781	291,585,781	-	131,217,641	-	131,217,641
2031	1,776,319,652	286,846,759	286,846,759	-	120,426,360	-	120,426,360
2032	1,702,116,615	281,698,408	281,698,408	-	110,332,062	-	110,332,062
2033	1,627,908,601	276,205,649	276,205,649	-	100,924,273	-	100,924,273
2034	1,554,051,828	270,199,639	270,199,639	-	92,107,197	-	92,107,197
2035	1,481,102,931	263,877,372	263,877,372	-	83,918,301	-	83,918,301
2036	1,409,454,615	257,098,083	257,098,083	-	76,277,965	-	76,277,965
2037	1,339,673,561	249,818,266	249,818,266	-	69,146,496	-	69,146,496
2038	1,272,412,233	242,107,541	242,107,541	-	62,517,274	-	62,517,274
2039	1,208,297,930	234,118,018	234,118,018	-	56,399,114	-	56,399,114
2040	1,147,845,570	225,837,383	225,837,383	-	50,755,020	-	50,755,020
2041	1,091,619,843	217,258,109	217,258,109	-	45,551,733	-	45,551,733
2042	1,040,233,830	208,413,615	208,413,615	-	40,766,246	-	40,766,246
2043	994,310,099	199,319,068	199,319,068	-	36,372,170	-	36,372,170
2044	954,500,272	190,135,640	190,135,640	-	32,369,025	-	32,369,025
2045	921,335,960	180,858,593	180,858,593	-	28,724,400	-	28,724,400
2046	895,391,903	171,611,252	171,611,252	-	25,427,479	-	25,427,479
2047	877,156,481	162,477,536	162,477,536	-	22,459,320	-	22,459,320
2048	867,066,307	153,480,804	153,480,804	-	19,792,610	-	19,792,610
2049	865,565,200	144,689,642	144,689,642	-	17,407,331	-	17,407,331
2050	873,057,882	136,136,138	136,136,138	-	15,279,667	-	15,279,667
2051	889,944,954	127,860,564	127,860,564	-	13,388,219	-	13,388,219
2052	916,614,122	119,867,205	119,867,205	-	11,709,337	-	11,709,337
2053	953,476,538	112,171,024	112,171,024	-	10,222,529	-	10,222,529
2054	1,000,957,416	104,779,011	104,779,011	-	8,908,358	-	8,908,358
2055	964,445,817	97,692,207	97,692,207	-	7,748,703	-	7,748,703
2056	932,646,186	90,905,531	90,905,531	-	6,726,748	-	6,726,748
2057	905,586,585	84,410,785	84,410,785	-	5,827,181	-	5,827,181
2058	883,305,577	78,198,511	78,198,511	-	5,036,221	-	5,036,221
2059	865,854,293	72,259,134	72,259,134	-	4,341,550	-	4,341,550
2060	853,297,454	66,584,077	66,584,077	-	3,732,228	-	3,732,228
2061	845,713,313	61,166,046	61,166,046	-	3,198,556	-	3,198,556
2062	843,193,300	55,999,514	55,999,514	-	2,731,955	-	2,731,955
2063	845,841,144	51,081,243	51,081,243	-	2,324,858	-	2,324,858
2064	853,771,381	46,410,495	46,410,495	-	1,970,593	-	1,970,593
2065	867,107,550	41,988,852	41,988,852	-	1,663,261	-	1,663,261
2066	885,980,431	37,818,861	37,818,861	-	1,397,593	-	1,397,593
2067	910,527,572	33,902,595	33,902,595	-	1,168,829	-	1,168,829
2068	940,894,266	30,242,000	30,242,000	-	972,689	-	972,689

Single Discount Rate Development Present Values of Projected Benefits at End of Year (Concluded)

Fiscal Year Ending June 30,	Projected Beginning Plan Net Position With Annuity Reserve	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)
2069	$ 977,234,233	$ 26,838,390	$ 26,838,390	$ -	$ 805,315	$ -	$ 805,315
2070	1,019,710,891	23,692,412	23,692,412	-	663,230	-	663,230
2071	1,068,498,733	20,802,567	20,802,567	-	543,272	-	543,272
2072	1,123,786,353	18,164,513	18,164,513	-	442,558	-	442,558
2073	1,185,780,398	15,773,248	15,773,248	-	358,520	-	358,520
2074	1,254,707,555	13,621,240	13,621,240	-	288,838	-	288,838
2075	1,330,818,604	11,699,193	11,699,193	-	231,441	-	231,441
2076	1,414,391,983	9,995,861	9,995,861	-	184,480	-	184,480
2077	1,505,737,791	8,498,024	8,498,024	-	146,316	-	146,316
2078	1,605,202,113	7,189,752	7,189,752	-	115,487	-	115,487
2079	1,713,172,407	6,055,705	6,055,705	-	90,747	-	90,747
2080	1,830,079,874	5,081,613	5,081,613	-	71,042	-	71,042
2081	1,956,401,491	4,250,578	4,250,578	-	55,438	-	55,438
2082	2,092,666,024	3,546,835	3,546,835	-	43,156	-	43,156
2083	2,239,456,580	2,955,873	2,955,873	-	33,553	-	33,553
2084	2,397,413,216	2,463,961	2,463,961	-	26,093	-	26,093
2085	2,567,236,223	2,056,438	2,056,438	-	20,317	-	20,317
2086	2,749,691,423	1,720,322	1,720,322	-	15,856	-	15,856
2087	2,945,613,142	1,444,539	1,444,539	-	12,421	-	12,421
2088	3,155,907,159	1,218,278	1,218,278	-	9,773	-	9,773
2089	3,381,555,569	1,032,202	1,032,202	-	7,725	-	7,725
2090	3,623,620,748	878,311	878,311	-	6,132	-	6,132
2091	3,883,249,742	750,267	750,267	-	4,887	-	4,887
2092	4,161,678,627	642,763	642,763	-	3,906	-	3,906
2093	4,460,237,851	551,609	551,609	-	3,127	-	3,127
2094	4,780,357,858	473,581	473,581	-	2,505	-	2,505
2095	5,123,575,278	406,260	406,260	-	2,004	-	2,004
2096	5,491,539,728	347,850	347,850	-	1,601	-	1,601
2097	5,886,021,296	297,035	297,035	-	1,276	-	1,276
2098	6,308,918,700	252,783	252,783	-	1,013	-	1,013
2099	6,762,268,242	214,290	214,290	-	801	-	801
2100	7,248,253,468	180,867	180,867	-	631	-	631
2101	7,769,215,635	151,904	151,904	-	494	-	494
2102	8,327,664,969	126,873	126,873	-	385	-	385
2103	8,926,292,726	105,309	105,309	-	298	-	298
2104	9,567,984,143	86,831	86,831	-	229	-	229
2105	10,255,832,305	71,081	71,081	-	175	-	175
2106	10,993,153,055	57,730	57,730	-	133	-	133
2107	11,783,500,991	46,499	46,499	-	100	-	100
2108	12,630,686,571	37,151	37,151	-	74	-	74
2109	13,538,794,472	29,459	29,459	-	55	-	55
2110	14,512,203,295	23,200	23,200	-	40	-	40
2111	15,555,606,692	18,179	18,179	-	30	-	30
2112	16,674,035,992	14,216	14,216	-	22	-	22
2113	17,872,884,462	11,126	11,126	-	16	-	16
2114	19,157,933,336	8,737	8,737	-	12	-	12
2115	20,535,379,698	6,896	6,896	-	8	-	8
2116	22,011,866,358	5,476	5,476	-	6	-	6
2117	23,594,513,880	4,373	4,373	-	5	-	5
2118	25,290,954,901	-	-	-	-	-	-
				Totals	$ 3,725,455,416	$ -	$ 3,725,455,416


Projection of Plan Net Position With Annuity Reserve and Benefit Payments
End of Year
$ [thousands]
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94 97 100
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.
AFC	Average Final Compensation.

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. Also known as service cost.

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.
PERSIA	Public Employees Retirement System Investment Act (Michigan PA 314).
POA	The 8th Amended Plan for the Adjustment of the Debt of the City of Detroit.
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. Also known as normal cost.
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.

GRS Retirement Consulting
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October 17, 2018

Mr. David Cetlinski, Executive Director
The Police and Fire Retirement System
of the City of Detroit
One Detroit Center
500 Woodward Avenue, Suite 3000
Detroit, MI 48226-3534

Dear David:

Please find enclosed 20 copies of the GASB Statement Nos. 67 and 68 Accounting and Financial Reporting for Pension Plans of Component II report of the Police and Fire Retirement System of the City of Detroit.

Sincerely,

Kenneth G. Alberts

KGA:ah
Enclosures

cc: Cynthia A. Thomas, City of Detroit Retirement Systems
Lamonica Arrington-Cabean, City of Detroit Retirement Systems
David T. Kausch, GRS
Judith A. Kermans, GRS