MUNICIPAL EMPLOYEES' RETIREMENT SYSTEM OF MICHIGAN

ANNUAL ACTUARIAL VALUATION REPORT DECEMBER 31, 2017

MADISON HEIGHTS, CITY OF (6308)

Spring, 2018

Madison Heights, City of

In care of:
Municipal Employees' Retirement System of Michigan
1134 Municipal Way
Lansing, Michigan 48917

This report presents the results of the Annual Actuarial Valuation, prepared as of December 31, 2017. The report includes the determination of liabilities and contribution rates resulting from the participation of Madison Heights, City of (6308) in the Municipal Employees' Retirement System of Michigan ("MERS"). MERS is an independent, professional retirement services company that was created to administer retirement plans for Michigan municipalities on a not-for-profit basis. This report contains the minimum actuarially determined contribution requirement, in alignment with the MERS Plan Documents, funding policy and Michigan Constitution. Madison Heights, City of is responsible for the employer contributions needed to provide MERS benefits for its employees and former employees under the Michigan Constitution and the MERS Plan Document.

The purpose of the December 31, 2017 annual actuarial valuation is to:

- Measure funding progress
- Establish contribution requirements for the fiscal year beginning July 1, 2019
- Provide actuarial information in connection with applicable Governmental Accounting Standards Board (GASB) statements

This valuation report should not be relied upon for any other purpose. Reliance on information contained in this report by anyone for anything other than the intended purpose could be misleading.

The valuation uses financial data, plan provision data, and participant data as of December 31, 2017 furnished by MERS. In accordance with Actuarial Standards of Practice No. 23, the data was checked for internal and year to year consistency as well as general reasonableness, but was not otherwise audited. CBIZ Retirement Plan Services does not assume responsibility for the accuracy or completeness of the data used in this valuation.

The actuarial assumptions and methods are adopted by the MERS Retirement Board, and are reviewed every five years in an Experience Study. The most recent study was completed in 2015. Please refer to the division-specific assumptions described in table(s) in this report, and to the Appendix on the MERS website at:
www.mersofmich.com/Portals/0/Assets/Resources/AAV-Appendix/MERS-2017AnnualActuarialValuation-Appendix.pdf.

The actuarial assumptions used for this valuation produce results that we believe are reasonable.

To the best of our knowledge, this report is complete and accurate, was prepared in conformity with generally recognized actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and is in compliance with Act No. 220 of the Public Acts of 1996, as amended, and the MERS Plan Document as revised. All of the undersigned are members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The Retirement Board of the Municipal Employees' Retirement System of Michigan confirms that the System provides for payment of the required employer contribution as described in Section 20m of Act No. 314 of 1965 (MCL 38.1140m).

This information is purely actuarial in nature. It is not intended to serve as a substitute for legal, accounting or investment advice.

This report was prepared at the request of the Retirement Board and may be provided only in its entirety by the municipality to other interested parties (MERS customarily provides the full report on request to associated third parties such as the auditor for the municipality). CBIZ Retirement Plan Services is not responsible for the consequences of any unauthorized use.

You should notify MERS if you disagree with anything contained in the report or are aware of any information that would affect the results of the report that have not been communicated to us. If you have reason to believe that the plan provisions are incorrectly described, that important plan provisions relevant to this valuation are not described, that conditions have changed since the calculations were made, that the information provided in this report is inaccurate or is in anyway incomplete, or if you need further information in order to make an informed decision on the subject matter in this report, please contact your Regional Manager at 1.800.767.MERS (6377).

Sincerely,

Cathy Nagy, MAAA, FSA
Jim Koss, MAAA, ASA
Curtis Powell, MAAA, EA

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Executive Summary

Funded Ratio and Required Employer Contributions

The MERS Defined Benefit Plan is an agent multiple-employer plan, meaning that assets are pooled for investment purposes but separate accounts are maintained for each individual employer. Each municipality is responsible for their own plan liabilities; MERS does not borrow from one municipality's account to pay for another.

The funded ratio of a plan is the percentage of the dollar value of the accrued benefits that is covered by the actuarial value of assets.

Your Funded Ratio:

	12/31/2017 *	12/31/2016
Funded Ratio	105%	105%

* Reflects assets from Surplus divisions, if any.

Michigan Law requires that pension plans be pre-funded, meaning money is set aside now to pay for future benefits. Pension plans are usually funded by employer and employee contributions, and investment income.

How quickly a plan attains the 100% funding goal depends on many factors such as:

- The current funded ratio
- The future experience of the plan
- The amortization period

It is more important to look at the trend in the funded ratio over a period of time than at a particular point in time.

Your Required Employer Contributions:

Your computed employer contributions are shown in the following table. Employee contributions, if any, are in addition to the computed employer contributions. Changes to the assumptions and methods based on the 2015 Experience Study were first reflected in the December 31, 2015 valuations. The impact of these changes is being phased-in over a 5 year period. The phase-in allows the employer to spread the impact of the new assumptions over 5 fiscal years. This valuation reflects the third year of the phase-in.

Your minimum required contribution is the amount in the “Phase-in” columns. By default, MERS will invoice you the phased-in contribution amount, but strongly encourages you to contribute more than the minimum required contribution. If for 2018 your municipality is making employer contributions based on rates without the phase-in applied, contact MERS to ensure the No Phase-in rate is used again for 2019 and not the defaulted phase-in rates.

	Percentage of Payroll				Monthly $ Based on Projected Payroll			
	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in
Valuation Date:	12/31/2017	12/31/2017	12/31/2016	12/31/2016	12/31/2017	12/31/2017	12/31/2016	12/31/2016
Fiscal Year Beginning:	July 1, 2019	July 1, 2019	July 1, 2018	July 1, 2018	July 1, 2019	July 1, 2019	July 1, 2018	July 1, 2018
Division								
01 - Non-Union and Departme	-	-	-	-	$ 6,570	$ 6,570	$ 6,867	$ 6,867
10 - Gnrl Crth	-	-	-	-	936	936	928	928
11 - Dept of Public Svcs TP	-	-	-	-	3,527	3,527	3,559	3,559
12 - AFSCME	-	-	-	-	1,213	1,213	1,269	1,269
13 - Cler Tmst	-	-	-	-	3,308	3,308	3,721	3,721
14 - Disptchrs	-	-	-	-	1,684	1,684	1,695	1,695
Municipality Total					**$ 17,238**	**$ 17,238**	**$ 18,039**	**$ 18,039**

Employee contribution rates reflected in the valuations are shown below:

	Employee Contribution Rate	
Valuation Date:	**12/31/2017**	**12/31/2016**
Division		
01 - Non-Union and Departme	2.50%	2.50%
10 - Gnrl Crth	5.54%	5.54%
11 - Dept of Public Svcs TP	4.84%	4.84%
12 - AFSCME	4.94%	4.94%
13 - Cler Tmst	2.50%	2.50%
14 - Disptchrs	2.50%	2.50%

The employer may contribute more than the minimum required contributions, as these additional contributions will earn investment income and may result in lower future contribution requirements.

Employers making contributions in excess of the minimum requirements may elect to apply the excess contribution immediately to a particular division, or segregate the excess into one or more of what MERS calls ”Surplus” divisions. An election in the first case would immediately reduce any unfunded accrued liability and lower the amortization payments throughout the remaining amortization period. An election to set up Surplus divisions would not immediately lower future contributions, however the assets from the Surplus divisions could be transferred to an unfunded division in the future to reduce the unfunded liability in future years, or to be used to pay all or a portion of the minimum required contribution in a future year. For purposes of this report, the assets in any Surplus division have been included in the municipality’s total assets, unfunded accrued liability and funded status, however, these assets are not used in calculating the minimum required contribution.

MERS strongly encourages employers to contribute more than the minimum contribution shown above.

If you are interested in making additional contributions, please contact MERS and they can assist you with evaluating your options.

How and Why Do These Numbers Change?

In a defined benefit plan, contributions vary from one annual actuarial valuation to the next as a result of the following:

- Changes in benefit provisions (see Table 2)
- Changes in actuarial assumptions and methods (see the Appendix)
- Experience of the plan (investment experience and demographic experience); this is the difference between actual experience of the plan and the actuarial assumptions. For example:
    - Lower actual investment returns would result in higher required employer contributions, and vice-versa.
    - Smaller than assumed pay increases would lower required employer contributions.
    - Reductions in the number of active employees would lower required contribution dollars, but would usually increase the contribution rate expressed as a percentage of (the now lower) payroll.
    - Retirements at earlier ages than assumed would usually increase required employer contributions.
    - More non-vested terminations of employment than assumed would decrease required contributions.
    - More disabilities or survivor (death) benefits than assumed would increase required contributions.
    - Longer lifetimes after retirement than assumed would increase required employer contributions.

Actuarial valuations do not affect the ultimate cost of the plan; the benefit payments (current and future) determine the cost of the plan. Actuarial valuations only affect the timing of the contributions into the plan. Because assumptions are for the long term, plan experience will not match the actuarial

assumptions in any given year (except by coincidence). Each annual actuarial valuation will adjust the required employer contributions up or down based on the prior year's actual experience.

Comments on Investment Return Assumption and Asset Smoothing

A defined benefit plan is funded by employer contributions, participant contributions, and investment earnings. Investment earnings have historically provided **more than half** of the funding. The larger the share of benefits being provided from investment returns, the smaller the required contributions, and vice versa. Determining the contributions required to prefund the promised retirement benefits requires an assumption of what investment earnings are expected to add to the fund over a long period of time. This is called the **Investment Return Assumption**.

The MERS Investment Return Assumption is **7.75%** per year. This, along with all of our other actuarial assumptions, is reviewed every five years in an Experience Study that compares the assumptions used against actual experience and recommends adjustments if necessary. If your municipality would like to explore contributions at lower investment return assumptions, please review the budget projection scenarios later in this report.

To avoid dramatic spikes and dips in annual contribution requirements due to short term fluctuations in asset markets, MERS applies a technique called **asset smoothing**. This spreads out each year's investment gains or losses over the prior year and the following four years. This smoothing method is used to determine your actuarial value of assets (valuation assets), which is then used to determine both your funded ratio and your required contributions. The (smoothed) **actuarial rate of return for 2017 was 6.08%, while the actual market rate of return was 13.07%**. To see historical details of the market rate of return, compared to the smoothed actuarial rate of return, refer to this report's Appendix, or visit our Defined Benefit resource page on the MERS website.

As of December 31, 2017 the actuarial value of assets is 101% of market value due to asset smoothing. This means that meeting the actuarial assumption in the next few years will require average annual market returns that exceed the 7.75% investment return assumption, or contribution requirements will continue to increase.

If the December 31, 2017 valuation results were based on market value instead of the actuarial value:

- The funded percent of your entire municipality would be 104% (instead of 105%); and
- Your total employer contribution requirement for the fiscal year starting July 1, 2019 would be $211,704 (instead of $206,856).

Risk Characteristics of Defined Benefit Plans

It is important to understand that Defined Benefit retirement plans, the plan sponsor, and the plan participants are exposed to certain risks. While risks cannot be eliminated entirely, they can be managed through various strategies. Below are a few examples of risk (this is not an all-inclusive list):

- Economic - investment return, wage inflation, etc.
- Demographic - longevity, disability, retirement, etc.
- Plan Sponsor and Employees - contribution volatility, attract/retain employees, etc.

The MERS Retirement Board adopts certain assumptions and methods to manage the economic and demographic risks, and the contribution volatility risks. For example, the investment risk is the largest economic risk and is managed by having a balanced portfolio and a clearly defined investment strategy. Demographic risks are managed by preparing special studies called experience studies on a regular basis to determine if the assumptions used are reasonable compared to the experience. An Experience Study is completed every five years to review the assumptions and methods. The next Experience Study will be completed in 2020.

Risk can also be managed through a plan design that provides benefits that are sustainable in the long run.

The Actuarial Standards Board has issued Actuarial Standards of Practice (ASOP) No. 51. This standard will be effective for any actuarial work with a measurement date on or after November 1, 2018. This means, the December 31, 2018 and later annual actuarial valuation reports for MERS will have to comply with this standard. This standard will require the actuary to identify risks that, in the actuary's professional judgment may significantly impact the plan's future financial condition. The actuary will have to assess the potential effects of the identified risks on the plan's future financial condition. The assessment may or may not be based on numerical calculations. However, the assessment should reflect the specifics of the plan (i.e. funded status, plan demographics, funding policy, etc.). If the actuary concludes that numerical calculations are necessary to assess the risk, the actuary can use various methods to quantify the risk such as scenario tests, sensitivity tests, stress tests, etc.

Some of these risk assessment measures have already been incorporated in the MERS annual valuation reports. For example, the projections of funded percentage and employer contributions shown on the following pages could be used to gauge the risk associated with long term investment rates of return different than the assumed 7.75% annual rate. A history of the municipality's funded percentage as shown in Table 7, could indicate the trend in funded status over time.

Alternate Scenarios to Estimate the Potential Volatility of Results ("What If Scenarios")

The calculations in this report are based on assumptions about long-term economic and demographic behavior. These assumptions will never materialize in a given year, except by coincidence. Therefore

the results will vary from one year to the next. The volatility of the results depends upon the characteristics of the plan. For example:

- Open divisions that have substantial assets compared to their active employee payroll will have more volatile employer contribution rates due to investment return fluctuations.
- Open divisions that have substantial accrued liability compared to their active employee payroll will have more volatile employer contribution rates due to demographic experience fluctuations.
- Small divisions will have more volatile contribution patterns than larger divisions because statistical fluctuations are relatively larger among small populations.
- Shorter amortization periods result in more volatile contribution patterns.

The analysis in this section is intended to review the potential volatility of the actuarial valuation results. It is important to note that calculations in this report are mathematical estimates based upon assumptions regarding future events, which may or may not materialize. Actuarial calculations can and do vary from one valuation to the next, sometimes significantly depending on the group's size.

Many assumptions are important in determining the required employer contributions. In the table below, we show the impact of varying the Investment Return Assumption. Lower investment returns would result in higher required employer contributions, and vice-versa.

The relative impact of each investment return scenario below will vary from year to year, as the participant demographics change. The impact of each scenario should be analyzed for a given year, not from year to year. The results in the table are based on the December 31, 2017 valuation, and are for the municipality in total, not by division. These results do not reflect a 5-year phase in of the impact of the new actuarial assumptions.

	Assumed Future Annual Smoothed Investment Return Assumption			
	Lower Future Annual Returns		**Valuation Assumption**	**Higher Returns**
12/31/2017 Valuation Results	**5.75%**	**6.75%**	**7.75%**	**8.75%**
Accrued Liability	$ 49,600,792	$ 44,775,429	$ 40,668,118	$ 37,149,438
Valuation Assets[1]	$ 42,584,619	$ 42,584,619	$ 42,584,619	$ 42,584,619
Unfunded Accrued Liability	$ 7,016,173	$ 2,190,810	$ (1,916,501)	$ (5,435,181)
Funded Ratio	86%	95%	105%	115%
Monthly Normal Cost	$ 32,014	$ 23,642	$ 17,238	$ 12,315
Monthly Amortization Payment	$ 65,413	$ 23,749	$ 0	$ 0
Total Employer Contribution[2]	$ 97,427	$ 47,391	$ 17,238	$ 12,315

1 The Valuation Assets include assets from Surplus divisions, if any.

2 If assets exceed accrued liabilities for a division, the division's amortization payment is negative and is used to reduce the division's employer contribution requirement. If the overfunding credit is larger than the normal cost, the division's full credit is included in the municipality's amortization payment above but the division's total contribution requirement is zero. This can cause the displayed normal cost and amortization payment to not add up to the displayed total employer contribution.

Projection Scenarios

The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate assumed long-term investment return assumption scenarios. All four projections take into account the past investment losses that will continue to affect the actuarial rate of return in the short term. Under the 7.75% scenarios in the table on the next page, two sets of projections are shown:

- Based on the phase-in over 5 fiscal years (beginning in 2017) of the increased contribution requirements associated with the new actuarial assumptions. This projects your minimum required contribution.
- Based on no phase-in of the increased contribution requirements.

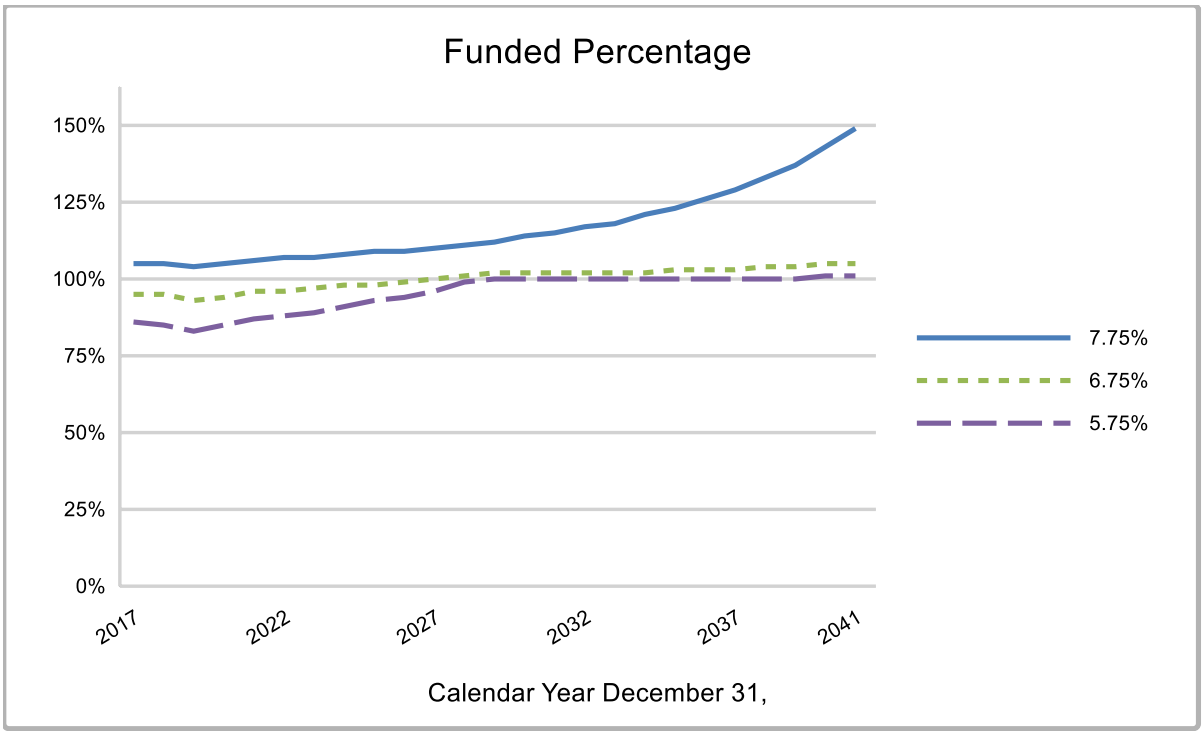
The 7.75% scenarios provide an estimate of computed employer contributions based on current actuarial assumptions, and a projected 7.75% market return. The other two scenarios may be useful if the municipality chooses to budget more conservatively, and make contributions in addition to the minimum requirements. The 6.75% and 5.75% projections provide an indication of the potential required employer contribution if MERS were to realize annual investment returns of 6.75% and 5.75% over the long-term.

The projections are shown both in tabular and graphical form in total for the employer. The tables show projections for six years. The graphs show projections for twenty five years.

Valuation Year Ending 12/31	Fiscal Year Beginning 7/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.75%[1]					
WITH 5-YEAR PHASE-IN					
2017	2019	$ 40,668,118	$ 42,584,619	105%	$ 206,856
2018	2020	41,300,000	43,400,000	105%	187,000
2019	2021	41,700,000	43,100,000	104%	178,000
2020	2022	41,900,000	44,000,000	105%	157,000
2021	2023	42,100,000	44,700,000	106%	143,000
2022	2024	42,100,000	44,900,000	107%	129,000
NO 5-YEAR PHASE-IN					
2017	2019	$ 40,668,118	$ 42,584,619	105%	$ 206,856
2018	2020	41,300,000	43,400,000	105%	187,000
2019	2021	41,700,000	43,100,000	104%	178,000
2020	2022	41,900,000	44,000,000	105%	157,000
2021	2023	42,100,000	44,700,000	106%	143,000
2022	2024	42,100,000	44,900,000	107%	129,000
6.75%[1]					
NO 5-YEAR PHASE-IN					
2017	2019	$ 44,775,429	$ 42,584,619	95%	$ 568,692
2018	2020	45,400,000	43,000,000	95%	593,000
2019	2021	45,700,000	42,500,000	93%	686,000
2020	2022	45,900,000	43,300,000	94%	622,000
2021	2023	46,000,000	44,000,000	96%	569,000
2022	2024	45,900,000	44,200,000	96%	564,000
5.75%[1]					
NO 5-YEAR PHASE-IN					
2017	2019	$ 49,600,792	$ 42,584,619	86%	$ 1,169,124
2018	2020	50,100,000	42,600,000	85%	1,270,000
2019	2021	50,500,000	41,900,000	83%	1,380,000
2020	2022	50,600,000	42,900,000	85%	1,330,000
2021	2023	50,600,000	43,900,000	87%	1,290,000
2022	2024	50,400,000	44,400,000	88%	1,310,000

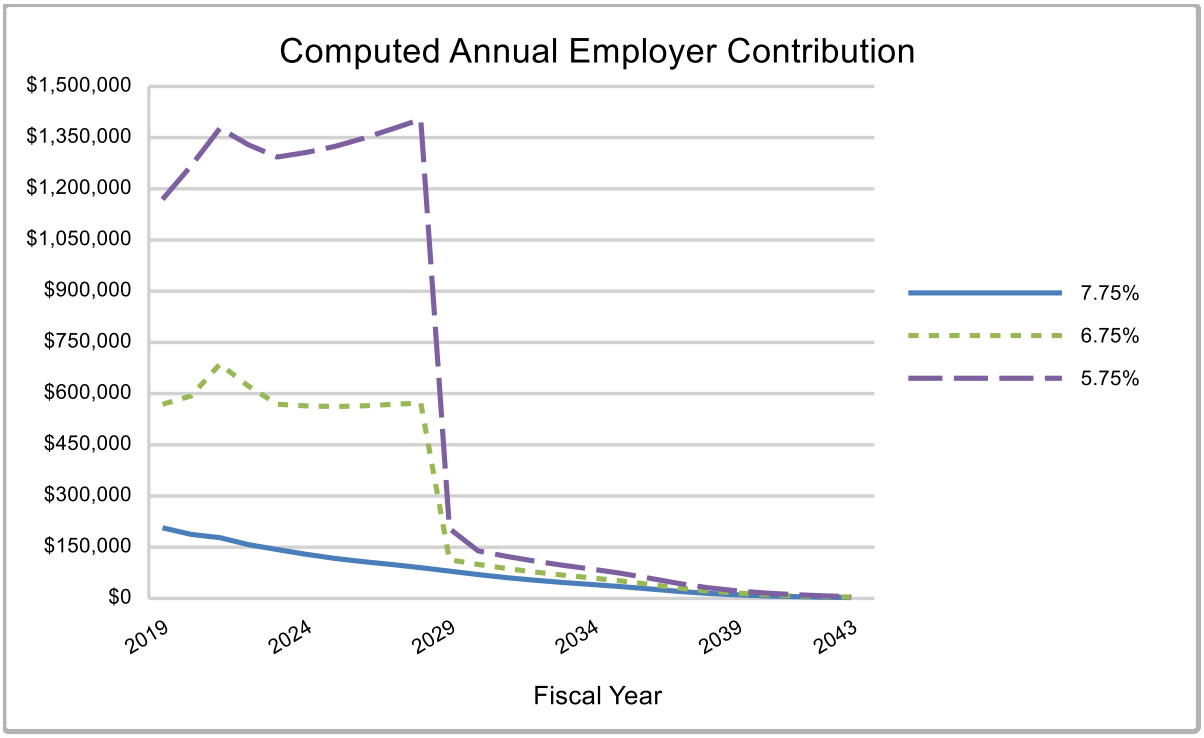
1 Represents both the interest rate for discounting liabilities and the future investment return assumption on the Market Value of assets.

2 Valuation Assets do not include assets from Surplus divisions, if any.



Notes:

All projected funded percentages are shown with no phase-in.



Notes:

All projected contributions are shown with no phase-in.

Employer Contribution Details For the Fiscal Year Beginning July 1, 2019

Table 1

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1]			Computed Employer Contribut. With Phase-In	Blended ER Rate No Phase-In[5]	Blended ER Rate With Phase-In[5]	Employee Contribut. Conversion Factor[2]
			Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	Computed Employer Contribut. No Phase-In				
Percentage of Payroll									
01 - Non-Union and Depa	14.33%	2.50%	-	-	-	-			
10 - Gnrl Crth	11.39%	5.54%	-	-	-	-			
11 - Dept of Public Svc	11.64%	4.84%	-	-	-	-			
12 - AFSCME	12.15%	4.94%	-	-	-	-			
13 - Cler Tmst	10.38%	2.50%	-	-	-	-			
14 - Disptchrs	10.06%	2.50%	-	-	-	-			
Estimated Monthly Contribution[3]									
01 - Non-Union and Depa			$ 6,570	$ 0	$ 6,570	$ 6,570			
10 - Gnrl Crth			936	0	936	936			
11 - Dept of Public Svc			3,527	0	3,527	3,527			
12 - AFSCME			1,213	0	1,213	1,213			
13 - Cler Tmst			3,308	0	3,308	3,308			
14 - Disptchrs			1,684	0	1,684	1,684			
Total Municipality			**$ 17,238**	**$ 0**	**$ 17,238**	**$ 17,238**			
Estimated Annual Contribution[3]			**$ 206,856**	**$ 0**	**$ 206,856**	**$ 206,856**			

1 The above employer contribution requirements are in addition to the employee contributions, if any.

2 If employee contributions are increased/decreased by 1.00% of pay, the employer contribution requirement will decrease/increase by the Employee Contribution Conversion Factor. The conversion factor is usually under 1%, because employee contributions may be refunded at termination of employment, and not used to fund retirement pensions. Employer contributions will all be used to fund pensions.

3 For divisions that are open to new hires, estimated contributions are based on projected fiscal year payroll. Actual contributions will be based on actual reported monthly pays, and will be different from the above amounts. For divisions that will have no new hires (i.e. closed divisions), invoices will be based on the above dollar amounts which are based on projected fiscal year payroll. See description of Open Divisions and Closed Divisions in the Appendix.

4 If projected assets exceed projected liabilities as of the beginning of the July 1, 2019 fiscal year, the negative unfunded accrued liability is treated as overfunding credit and is used to reduce the contribution. This amortization is used to reduce the employer contribution rate. Note that if the overfunding credit is larger than the normal cost, the full credit is shown above but the total contribution requirement is zero. This will cause the displayed normal cost and unfunded accrued liability contributions to not add across.

5 For linked divisions, the employer will be invoiced the Computed Employer Contribution with Phase-in rate shown above for each linked division (a contribution rate for the open division; a contribution dollar for the closed-but-linked division), unless the employer elects to contribute the Blended Employer Contribution rate shown above, by contacting MERS at 800-767-MERS (6377).

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Benefit Provisions

Table 2

01 - Non-Union and Department Heads: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	3 years	3 years
Employee Contributions:	2.50%	2.50%
DC Plan for New Hires:	7/1/2010	7/1/2010
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

10 - Gnrl Crth: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.00% Multiplier (no max)	2.00% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	50/25	50/25
	55/15	55/15
Early Retirement (Reduced):	-	-
Final Average Compensation:	5 years	5 years
Employee Contributions:	5.54%	5.54%
DC Plan for New Hires:	10/1/2006	10/1/2006
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

11 - Dept of Public Svcs TPOAM: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.25% Multiplier (80% max)	2.25% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	5 years	5 years
Employee Contributions:	4.84%	4.84%
DC Plan for New Hires:	8/1/2006	8/1/2006
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

Table 2 (continued)

12 - AFSCME: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.25% Multiplier (80% max)	2.25% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	5 years	5 years
Employee Contributions:	4.94%	4.94%
DC Plan for New Hires:	7/1/2010	7/1/2010
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

13 - Cler Tmst: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.00% Multiplier (no max)	2.00% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.50%	2.50%
DC Plan for New Hires:	7/1/2010	7/1/2010
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

14 - Disptchrs: Closed to new hires

	2017 Valuation	2016 Valuation
Benefit Multiplier:	2.00% Multiplier (no max)	2.00% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.50%	2.50%
DC Plan for New Hires:	9/1/2010	9/1/2010
Act 88:	Yes (Adopted 2/9/1970)	Yes (Adopted 2/9/1970)

Participant Summary

Table 3

Division	2017 Valuation		2016 Valuation		2017 Valuation		
	Number	Annual Payroll[1]	Number	Annual Payroll[1]	Average Age	Average Benefit Service[2]	Average Eligibility Service[2]
01 - Non-Union and Depart							
Active Employees	9	$ 846,153	9	$ 830,202	52.8	18.0	21.5
Vested Former Employees	1	27,651	1	27,651	49.3	11.7	11.7
Retirees and Beneficiaries	23	712,041	23	712,041	72.5		
10 - Gnrl Crth							
Active Employees	4	$ 219,296	4	$ 212,327	52.6	21.3	21.3
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	8	150,565	10	190,230	70.4		
11 - Dept of Public Svcs							
Active Employees	13	$ 734,306	13	$ 722,547	49.2	21.7	21.7
Vested Former Employees	2	22,765	2	22,765	56.1	12.0	14.5
Retirees and Beneficiaries	44	851,612	44	851,612	67.8		
12 - AFSCME							
Active Employees	3	$ 223,172	3	$ 218,625	48.4	20.9	23.3
Vested Former Employees	6	77,113	6	77,113	52.6	10.9	17.6
Retirees and Beneficiaries	19	476,235	19	476,235	71.6		
13 - Cler Tmst							
Active Employees	14	$ 682,145	15	$ 729,757	55.0	24.0	24.0
Vested Former Employees	9	75,740	10	82,288	51.6	10.1	14.8
Retirees and Beneficiaries	32	453,877	30	435,808	73.2		
14 - Disptchrs							
Active Employees	5	$ 259,967	5	$ 256,463	44.7	17.0	17.0
Vested Former Employees	3	34,633	4	37,073	46.1	13.6	13.6
Retirees and Beneficiaries	2	15,672	1	13,799	60.3		
Total Municipality							
Active Employees	**48**	**$ 2,965,039**	**49**	**$ 2,969,921**	**51.3**	**21.1**	**21.9**
Vested Former Employees	**21**	**237,902**	**23**	**246,890**	**51.4**	**11.1**	**15.3**
Retirees and Beneficiaries	**128**	**2,660,002**	**127**	**2,679,725**	**70.6**		
Total Participants	**197**		**199**				

[1] Annual payroll for active employees; annual deferred benefits payable for vested former employees; annual benefits being paid for retirees and beneficiaries.

[2] Description can be found under Miscellaneous and Technical Assumptions in the Appendix.

Reported Assets (Market Value)

Table 4

Division	2017 Valuation		2016 Valuation	
	Employer and Retiree[1]	Employee[2]	Employer and Retiree[1]	Employee[2]
01 - Non-Union and Department Heads	$ 11,534,591	$ 163,778	$ 10,761,494	$ 140,157
10 - Gnrl Crth	2,475,835	155,863	2,324,899	141,228
11 - Dept of Public Svcs TPOAM	12,240,211	385,878	11,498,768	408,966
12 - AFSCME	6,249,396	175,799	5,940,834	161,924
13 - Cler Tmst	7,351,732	242,218	6,839,054	232,774
14 - Disptchrs	1,095,791	36,824	966,727	29,997
Municipality Total	**$ 40,947,556**	**$ 1,160,360**	**$ 38,331,776**	**$ 1,115,046**
Combined Assets	**$42,107,916**		**$39,446,822**	

[1] Reserve for Employer Contributions and Benefit Payments

[2] Reserve for Employee Contributions

The December 31, 2017 valuation assets (actuarial value of assets) are equal to 1.011321 times the reported market value of assets (compared to 1.077095 as of December 31, 2016). The derivation of valuation assets is described, and detailed calculations of valuation assets are shown, in the Appendix.

Flow of Valuation Assets

Table 5

Year Ended 12/31	Employer Contributions		Employee Contributions	Investment Income (Valuation Assets)	Benefit Payments	Employee Contribution Refunds	Net Transfers	Valuation Asset Balance
	Required	Additional						
2007	$ 668,249		$ 65,339	$ 2,054,668	$ (1,638,877)	$ 0	$ 0	$ 26,541,208
2008	671,925		60,985	1,102,980	(1,734,081)	(4,983)	(3,514)	26,634,520
2009	682,056		59,268	990,212	(1,791,304)	(5,649)	0	26,569,103
2010	729,975		56,090	1,238,090	(2,045,599)	0	0	26,547,659
2011	769,629	$ 0	92,448	1,177,872	(2,287,911)	0	0	26,299,697
2012	735,318	97,628	148,561	1,058,049	(2,360,656)	0	0	25,978,597
2013	839,178	141,000	136,395	1,431,930	(2,493,847)	(3,492)	0	26,029,761
2014	969,840	0	134,964	1,421,442	(2,554,256)	(3,658)	8,120	26,006,213
2015	1,077,399	231,772	115,135	1,228,473	(2,618,833)	(4,951)	0	26,035,208
2016	939,669	15,276,020	107,113	2,799,114	(2,669,149)	0	0	42,487,975
2017	234,378	0	103,814	2,461,392	(2,672,979)	(29,961)	0	42,584,619

Notes:

Transfers in and out are usually related to the transfer of participants between municipalities, and to employer and employee payments for service credit purchases (if any) that the governing body has approved.

Additional employer contributions, if any, are shown separately starting in 2011. Prior to 2011, additional contributions are combined with the required employer contributions.

The investment income column reflects the recognized investment income based on Valuation Assets. It does not reflect the market value investment return in any given year.

The Valuation Assets include assets from Surplus divisions, if any.

Actuarial Accrued Liabilities and Valuation Assets
As of December 31, 2017

Table 6

Division	Actuarial Accrued Liability	Valuation Assets[1]	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
01 - Non-Union and Department Heads				
Active Employees	$ 3,912,637	$ 4,460,713	114.0%	$ (548,076)
Vested Former Employees	129,391	129,391	100.0%	0
Retirees And Beneficiaries	7,240,702	7,240,702	100.0%	0
Pending Refunds	0	0	0.0%	0
Total	**$ 11,282,730**	**$ 11,830,806**	**104.9%**	**$ (548,076)**
10 - Gnrl Crth				
Active Employees	$ 872,076	$ 1,340,968	153.8%	$ (468,892)
Vested Former Employees	0	0	0.0%	0
Retirees And Beneficiaries	1,316,325	1,316,325	100.0%	0
Pending Refunds	4,198	4,198	100.0%	0
Total	**$ 2,192,599**	**$ 2,661,491**	**121.4%**	**$ (468,892)**
11 - Dept of Public Svcs TPOAM				
Active Employees	$ 3,254,966	$ 3,808,415	117.0%	$ (553,449)
Vested Former Employees	228,670	228,670	100.0%	0
Retirees And Beneficiaries	8,731,810	8,731,810	100.0%	0
Pending Refunds	134	134	100.0%	0
Total	**$ 12,215,580**	**$ 12,769,029**	**104.5%**	**$ (553,449)**
12 - AFSCME				
Active Employees	$ 970,039	$ 1,014,202	104.6%	$ (44,163)
Vested Former Employees	605,306	605,306	100.0%	0
Retirees And Beneficiaries	4,864,398	4,864,398	100.0%	0
Pending Refunds	14,029	14,029	100.0%	0
Total	**$ 6,453,772**	**$ 6,497,935**	**100.7%**	**$ (44,163)**
13 - Cler Tmst				
Active Employees	$ 3,002,031	$ 3,237,769	107.9%	$ (235,738)
Vested Former Employees	508,394	508,394	100.0%	0
Retirees And Beneficiaries	3,928,765	3,928,765	100.0%	0
Pending Refunds	4,993	4,993	100.0%	0
Total	**$ 7,444,183**	**$ 7,679,921**	**103.2%**	**$ (235,738)**
14 - Disptchrs				
Active Employees	$ 734,464	$ 800,647	109.0%	$ (66,183)
Vested Former Employees	176,181	176,181	100.0%	0
Retirees And Beneficiaries	168,609	168,609	100.0%	0
Pending Refunds	0	0	0.0%	0
Total	**$ 1,079,254**	**$ 1,145,437**	**106.1%**	**$ (66,183)**

Table 6 (continued)

Division	Actuarial Accrued Liability	Valuation Assets[1]	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
Total Municipality				
Active Employees	$ 12,746,213	$ 14,662,714	115.0%	$ (1,916,501)
Vested Former Employees	1,647,942	1,647,942	100.0%	0
Retirees and Beneficiaries	26,250,609	26,250,609	100.0%	0
Pending Refunds	23,354	23,354	100.0%	0
Total	$ 40,668,118	$ 42,584,619	104.7%	$ (1,916,501)

1 Includes both employer and employee assets.

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Actuarial Accrued Liabilities - Comparative Schedule

Table 7

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2003	$ 25,520,723	$ 23,179,652	91%	$ 2,341,071
2004	27,642,742	23,897,237	86%	3,745,505
2005	28,414,461	24,458,557	86%	3,955,904
2006	29,681,342	25,391,829	86%	4,289,513
2007	31,205,728	26,541,208	85%	4,664,520
2008	32,402,367	26,634,520	82%	5,767,847
2009	32,752,091	26,569,103	81%	6,182,988
2010	34,126,156	26,547,659	78%	7,578,497
2011	35,497,987	26,299,697	74%	9,198,290
2012	36,066,667	25,978,597	72%	10,088,070
2013	37,260,900	26,029,761	70%	11,231,139
2014	38,278,641	26,006,213	68%	12,272,428
2015	40,440,589	26,035,208	64%	14,405,381
2016	40,503,803	42,487,975	105%	(1,984,172)
2017	40,668,118	42,584,619	105%	(1,916,501)

Notes: Actuarial assumptions were revised for the 2004, 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

The Valuation Assets include assets from Surplus divisions, if any.

Division 01 - Non-Union and Department Heads

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 8,274,109	$ 6,309,434	76%	$ 1,964,675
2008	8,685,702	6,286,268	72%	2,399,434
2009	8,038,466	5,658,718	70%	2,379,748
2010	8,479,273	5,680,461	67%	2,798,812
2011	9,002,861	5,618,427	62%	3,384,434
2012	9,210,025	5,577,487	61%	3,632,538
2013	10,121,532	5,664,596	56%	4,456,936
2014	10,813,793	5,826,893	54%	4,986,900
2015	11,254,450	5,871,025	52%	5,383,425
2016	11,113,019	11,742,114	106%	(629,095)
2017	11,282,730	11,830,806	105%	(548,076)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-01: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	14	$ 1,182,345	20.01%	0.00%
2008	14	1,174,358	22.90%	0.00%
2009	14	1,202,689	23.37%	0.00%
2010	12	1,031,825	$ 24,020	0.00%
2011	11	972,440	$ 26,338	2.50%
2012	11	989,346	$ 28,727	2.50%
2013	10	834,038	$ 34,367	2.50%
2014	11	892,963	$ 40,155	2.50%
2015	10	883,258	$ 46,422	2.50%
2016	9	830,202	$ 6,867	2.50%
2017	9	846,153	$ 6,570	2.50%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 10 - Gnrl Crth

Table 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 1,510,707	$ 1,413,469	94%	$ 97,238
2008	1,613,659	1,449,675	90%	163,984
2009	1,979,624	1,791,716	91%	187,908
2010	2,014,257	1,776,297	88%	237,960
2011	2,082,999	1,767,933	85%	315,066
2012	2,129,740	1,745,763	82%	383,977
2013	2,209,968	1,757,727	80%	452,241
2014	2,251,628	1,771,039	79%	480,589
2015	2,530,017	1,784,687	71%	745,330
2016	2,533,796	2,656,253	105%	(122,457)
2017	2,192,599	2,661,491	121%	(468,892)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-10: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	7	$ 346,669	$ 1,940	3.04%
2008	7	354,953	$ 2,943	3.04%
2009	7	358,201	$ 2,996	3.04%
2010	6	309,465	$ 3,312	3.04%
2011	6	305,279	$ 3,495	5.54%
2012	6	307,811	$ 4,094	5.54%
2013	6	309,969	$ 4,803	5.54%
2014	6	306,656	$ 5,386	5.54%
2015	4	213,988	$ 7,227	5.54%
2016	4	212,327	$ 928	5.54%
2017	4	219,296	$ 936	5.54%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 11 - Dept of Public Svcs TPOAM

Table 8-11: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 10,438,648	$ 9,206,357	88%	$ 1,232,291
2008	10,780,891	9,161,812	85%	1,619,079
2009	10,290,554	8,502,821	83%	1,787,733
2010	10,634,653	8,300,780	78%	2,333,873
2011	10,798,179	8,192,100	76%	2,606,079
2012	10,921,274	8,075,242	74%	2,846,032
2013	11,218,116	8,096,873	72%	3,121,243
2014	11,704,457	8,088,521	69%	3,615,936
2015	12,232,840	8,076,786	66%	4,156,054
2016	12,125,069	12,825,761	106%	(700,692)
2017	12,215,580	12,769,029	105%	(553,449)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-11: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	29	$ 1,461,577	$ 14,063	2.34%
2008	28	1,433,600	$ 18,318	2.34%
2009	27	1,334,228	$ 18,423	2.34%
2010	21	1,027,989	$ 20,370	2.34%
2011	20	1,047,392	$ 22,156	4.84%
2012	18	904,241	$ 24,466	4.84%
2013	18	941,118	$ 28,778	4.84%
2014	16	911,310	$ 35,901	4.84%
2015	15	831,702	$ 38,536	4.84%
2016	13	722,547	$ 3,559	4.84%
2017	13	734,306	$ 3,527	4.84%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 12 - AFSCME

Table 8-12: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 4,718,282	$ 3,957,761	84%	$ 760,521
2008	4,851,889	3,978,310	82%	873,579
2009	5,195,434	4,109,828	79%	1,085,606
2010	5,647,986	4,356,935	77%	1,291,051
2011	6,077,256	4,318,993	71%	1,758,263
2012	6,195,017	4,222,690	68%	1,972,327
2013	6,313,706	4,147,075	66%	2,166,631
2014	6,083,731	3,889,273	64%	2,194,458
2015	6,373,453	3,777,888	59%	2,595,565
2016	6,402,601	6,573,250	103%	(170,649)
2017	6,453,772	6,497,935	101%	(44,163)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-12: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	9	$ 615,532	12.95%	2.44%
2008	10	681,062	14.45%	2.44%
2009	10	683,363	16.61%	2.44%
2010	10	648,391	$ 10,539	2.44%
2011	9	618,088	$ 12,432	4.94%
2012	6	394,205	$ 13,283	4.94%
2013	6	414,844	$ 15,302	4.94%
2014	3	201,718	$ 15,088	4.94%
2015	3	219,313	$ 20,028	4.94%
2016	3	218,625	$ 1,269	4.94%
2017	3	223,172	$ 1,213	4.94%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 13 - Cler Tmst

Table 8-13: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 5,669,599	$ 5,098,949	90%	$ 570,650
2008	5,820,235	5,160,464	89%	659,771
2009	6,621,959	5,855,179	88%	766,780
2010	6,750,943	5,722,160	85%	1,028,783
2011	6,877,043	5,634,859	82%	1,242,184
2012	6,890,158	5,542,972	80%	1,347,186
2013	6,641,782	5,495,553	83%	1,146,229
2014	6,603,201	5,507,732	83%	1,095,469
2015	7,090,875	5,555,555	78%	1,535,320
2016	7,319,956	7,617,031	104%	(297,075)
2017	7,444,183	7,679,921	103%	(235,738)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-13: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	30	$ 1,318,856	11.06%	0.00%
2008	29	1,311,602	11.99%	0.00%
2009	29	1,330,765	12.64%	0.00%
2010	23	1,029,122	$ 12,383	0.00%
2011	21	952,124	$ 12,117	2.50%
2012	20	913,203	$ 12,910	2.50%
2013	18	819,952	$ 11,222	2.50%
2014	15	686,863	$ 10,603	2.50%
2015	14	690,139	$ 15,094	2.50%
2016	15	729,757	$ 3,721	2.50%
2017	14	682,145	$ 3,308	2.50%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 14 - Disptchrs

Table 8-14: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2007	$ 594,383	$ 555,238	93%	$ 39,145
2008	649,991	597,991	92%	52,000
2009	626,054	650,841	104%	(24,787)
2010	599,044	711,026	119%	(111,982)
2011	659,649	767,385	116%	(107,736)
2012	720,453	814,443	113%	(93,990)
2013	755,796	867,937	115%	(112,141)
2014	821,831	922,755	112%	(100,924)
2015	958,954	969,267	101%	(10,313)
2016	1,009,362	1,073,566	106%	(64,204)
2017	1,079,254	1,145,437	106%	(66,183)

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 actuarial valuations.

Table 9-14: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2007	9	$ 421,851	7.71%	0.00%
2008	9	414,190	9.45%	0.00%
2009	8	382,404	8.10%	0.00%
2010	6	295,262	4.49%	0.00%
2011	6	294,722	$ 644	2.50%
2012	6	296,804	$ 978	2.50%
2013	6	275,605	$ 642	2.50%
2014	5	245,316	$ 597	2.50%
2015	5	260,270	$ 1,786	2.50%
2016	5	256,463	$ 1,695	2.50%
2017	5	259,967	$ 1,684	2.50%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above. The contribution requirements including the 5-year phase-in are shown on page 6.

See the Benefit Provision History on page 37 for past benefit provision changes.

Division 01 - Non-Union and Department Heads

Table 10-01: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (628,579)	10	$ (668,253)	9	$ (89,220)
(Gain)/Loss	12/31/2017	128,836	10	144,100	10	17,628
Total				**$ (524,153)**		**$ (71,592)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Division 10 - Gnrl Crth

Table 10-10: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (123,956)	10	$ (131,782)	9	$ (17,592)
(Gain)/Loss	12/31/2017	(335,656)	10	(375,422)	10	(45,924)
Total				**$ (507,204)**		**$ (63,516)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Division 11 - Dept of Public Svcs TPOAM

Table 10-11: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (704,859)	10	$ (749,342)	9	$ (100,044)
(Gain)/Loss	12/31/2017	205,651	10	230,015	10	28,140
Total				**$ (519,327)**		**$ (71,904)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Division 12 - AFSCME

Table 10-12: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (170,098)	10	$ (180,836)	9	$ (24,144)
(Gain)/Loss	12/31/2017	139,087	10	155,565	10	19,032
Total				**$ (25,271)**		**$ (5,112)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Division 13 - Cler Tmst

Table 10-13: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (292,585)	10	$ (311,047)	9	$ (41,532)
(Gain)/Loss	12/31/2017	79,358	10	88,760	10	10,860
Total				**$ (222,287)**		**$ (30,672)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Division 14 - Disptchrs

Table 10-14: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2019		
				Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2016	$ (57,963)	10	$ (61,619)	9	$ (8,232)
(Gain)/Loss	12/31/2017	(3,774)	10	(4,221)	10	(516)
Total				**$ (65,840)**		**$ (8,748)**

1 For each type of UAL (layer), this is the original balance as of the date the layer was established.

2 According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

3 This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2017 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2017 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

GASB 68 Information

The following information has been prepared to provide some of the information necessary to complete GASB Statement No. 68 disclosures. Statement 68 is effective for fiscal years beginning after June 15, 2014. Additional resources, including an Implementation Guide, are available at www.mersofmich.com.

Actuarial Valuation Date:		12/31/2017
Measurement Date of Total Pension Liability (TPL):		12/31/2017
At 12/31/2017, the following employees were covered by the benefit terms:		
Inactive employees or beneficiaries currently receiving benefits:		128
Inactive employees entitled to but not yet receiving benefits:		21
Active employees:		48
		197
Covered employee payroll: (Needed for Required Supplementary Information)	$	2,965,039
Average expected remaining service lives of all employees (active and inactive):		2
Total Pension Liability as of 12/31/2016 measurement date:	$	39,563,400
Total Pension Liability as of 12/31/2017 measurement date:	$	39,737,687
Service Cost for the year ending on the 12/31/2017 measurement date:	$	336,203
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(529,379)
- Changes in assumptions[2]:	$	0

[1] A change in liability due to benefit changes is immediately recognized when calculating pension expense for the year.

[2] Changes in liability due to differences between actual and expected experience, and changes in assumptions, are recognized in pension expense over the average remaining service lives of all employees.

Sensitivity of the Net Pension Liability to changes in the discount rate:

	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Change in Net Pension Liability as of 12/31/2017:	$ 3,949,202	-	$ (3,388,578)

Note: The current discount rate shown for GASB 68 purposes is higher than the MERS assumed rate of return. This is because for GASB 68 purposes, the discount rate must be gross of administrative expenses, whereas for funding purposes it is net of administrative expenses.

Benefit Provision History

The following benefit provision history is provided by MERS. Any corrections to this history or discrepancies between this information and information displayed elsewhere in the valuation report should be reported to MERS. All provisions are listed by date of adoption.

01 - Non-Union and Department Heads

12/1/2016	Service Credit Purchase Estimates - No
7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
8/1/2011	Member Contribution Rate 2.50%
7/1/2010	DC Adoption Date 07-01-2010
7/1/1995	Benefit B-4 (80% max)
1/1/1987	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/1987	2.25% Multiplier (no max)
1/1/1987	Benefit F55 (With 15 Years of Service)
1/1/1985	Benefit C-2/Base B-1
7/1/1984	Member Contribution Rate 0.00%
7/1/1975	Benefit C-1 (Old)
2/9/1970	Covered by Act 88
7/1/1956	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1956	10 Year Vesting
7/1/1956	Benefit C (Old)
7/1/1956	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

10 - Gnrl Crth

12/1/2016	Service Credit Purchase Estimates - No
7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
8/1/2011	Member Contribution Rate 5.54%
10/1/2006	DC Adoption Date 10-01-2006
7/1/1998	Benefit B-2
7/1/1998	Benefit F50 (With 25 Years of Service)
7/1/1998	Member Contribution Rate 3.04%
7/1/1990	Benefit C-2/Base B-1
7/1/1990	Benefit F55 (With 15 Years of Service)
7/1/1984	Member Contribution Rate 0.00%
7/1/1975	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1975	10 Year Vesting
7/1/1975	Benefit C-1 (Old)
2/9/1970	Covered by Act 88
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

11 - Dept of Public Svcs TPOAM

12/1/2016	Service Credit Purchase Estimates - No
7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
8/1/2011	Member Contribution Rate 4.84%
4/1/2010	Temporary 30 Years & Out (04/01/2010 - 06/30/2010)
8/1/2006	DC Adoption Date 08-01-2006
1/1/2005	Member Contribution Rate 2.34%
7/1/2004	Benefit B-3 (80% max)
7/1/2004	Member Contribution Rate 3.09%
1/1/1994	Benefit B-2
1/1/1994	Benefit F55 (With 15 Years of Service)
1/1/1994	Member Contribution Rate 1.50%
1/1/1987	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1987	10 Year Vesting
1/1/1987	Benefit C-2/Base B-1
7/1/1984	Member Contribution Rate 0.00%
2/9/1970	Covered by Act 88
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

12 - AFSCME

12/1/2016	Service Credit Purchase Estimates - No
7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
8/1/2011	Member Contribution Rate 4.94%
7/1/2010	DC Adoption Date 07-01-2010
7/1/2004	Member Contribution Rate 2.44%
8/1/2003	Benefit B-3 (80% max)
8/1/2003	Member Contribution Rate 3.26%
7/1/2003	Member Contribution Rate 0.82%
6/1/1998	Benefit B-2
6/1/1998	Member Contribution Rate 1.63%
7/1/1987	Benefit C-2/Base B-1
7/1/1987	Benefit F55 (With 15 Years of Service)
7/1/1984	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1984	10 Year Vesting
7/1/1984	Member Contribution Rate 0.00%
2/9/1970	Covered by Act 88
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

13 - Cler Tmst

12/1/2016	Service Credit Purchase Estimates - No

13 - Cler Tmst

7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
8/1/2011	Member Contribution Rate 2.50%
7/1/2010	DC Adoption Date 07-01-2010
7/1/2004	Member Contribution Rate 0.00%
7/1/2003	Member Contribution Rate 0.90%
1/1/1994	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1994	10 Year Vesting
1/1/1994	Benefit B-2
1/1/1994	Benefit F55 (With 15 Years of Service)
1/1/1994	Member Contribution Rate 1.80%
2/9/1970	Covered by Act 88
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

14 - Disptchrs

12/1/2016	Service Credit Purchase Estimates - No
7/1/2016	Option B Yes
7/1/2016	Accelerated to 15-year Amortization
12/1/2011	Member Contribution Rate 2.50%
9/1/2010	DC Adoption Date 09-01-2010
12/1/2003	Benefit B-2
7/1/1990	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1990	10 Year Vesting
7/1/1990	Benefit C-2/Base B-1
7/1/1990	Benefit F55 (With 15 Years of Service)
7/1/1990	Member Contribution Rate 0.00%
2/9/1970	Covered by Act 88
	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

Plan Provisions, Actuarial Assumptions, and Actuarial Funding Method

Details on MERS plan provisions, actuarial assumptions, and actuarial methodology can be found in the Appendix. Some actuarial assumptions are specific to this municipality and its divisions. These are listed below.

Increase in Final Average Compensation

Division	FAC Increase Assumption
All Divisions	4.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	80%

Miscellaneous and Technical Assumptions

Loads – None.

Amortization Policy for Closed Divisions

Closed Division	Amortization Option
All Closed Divisions	Accelerated to 15-Year Amortization

Please see the Appendix on the MERS website for a detailed description of the amortization options available for closed divisions within an open municipality.