Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2018 - Charlotte City of (2301)

GRS Retirement Consulting

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Spring, 2019

Charlotte 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 for Charlotte City of (2301) as of December 31, 2018. The report includes the determination of liabilities and contribution rates resulting from the participation in the Municipal Employees' Retirement System of Michigan ("MERS"). This report contains the minimum actuarially determined contribution requirement, in alignment with the MERS Plan Document, Actuarial Policy, and the Michigan Constitution and governing statutes. Charlotte City of is responsible for the employer contributions needed to provide MERS benefits for its employees and former employees.

The purposes of this valuation are to:

- Measure funding progress as of December 31, 2018,
- Establish contribution requirements for the fiscal year beginning July 1, 2020,
- Provide information regarding the identification and assessment of risk,
- Provide actuarial information in connection with applicable Governmental Accounting Standards Board (GASB) statements, and
- Provide information to assist the local unit of government with state reporting requirements.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through December 31, 2018. The valuation was based upon information furnished by MERS concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by MERS.

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The Municipal Employees' Retirement Act, PA 427 of 1984 and the MERS' Plan Document Article VI sec. 71 (1)(d), provides the MERS Board with the authority to set actuarial assumptions and methods after consultation with the actuary. As the fiduciary of the plan, MERS Retirement Board sets certain assumptions for funding and GASB purposes. These assumptions are checked regularly through a comprehensive study, called an Experience Study. The most recent study was completed in 2015, as prepared by the prior actuary, and is the basis of the assumptions and methods currently in place. **At the February 28, 2019 board meeting, the MERS Retirement Board adopted new economic assumptions effective with the December 31, 2019 annual actuarial valuation, which will impact contributions beginning in 2021.** An illustration of the potential impact is found in this report.

The Michigan Department of Treasury provides required assumptions to be used for purposes of Public Act 202 reporting. These assumptions are for reporting purposes only and do not impact required contributions. Please refer to the State Reporting page found at the end of this report for information for this filing.

For a full list of all the assumptions used, please refer to the division-specific assumptions described in table(s) in this report, and to the Appendix on the MERS website at:
http://www.mersofmich.com/Portals/0/Assets/Resources/AAV-Appendix/MERS-2018AnnualActuarialValuation-Appendix.pdf.

The actuarial assumptions used for this valuation are reasonable for purposes of the measurement.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of Charlotte City of as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

David T. Kausch, Rebecca L. Stouffer, and Mark Buis are members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor. GRS maintains independent consulting agreements with certain local units of government for services unrelated to the actuarial consulting services provided in this report.

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 MERS 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). GRS is not responsible for the consequences of any unauthorized use. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

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,

David T Kausch

David T. Kausch, FSA, FCA, EA, MAAA

Rebecca L. Stouffer

Rebecca L. Stouffer, ASA, FCA, MAAA

Mark Buis

Mark Buis, FSA, FCA, EA, MAAA

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Executive Summary

Funded Ratio

The funded ratio of a plan is the percentage of the dollar value of the actuarial accrued liability that is covered by the actuarial value of assets. While funding ratio may be a useful plan measurement, understanding a plan's funding trend may be more important than a particular point in time. Refer to Table 7 to find a history of this information.

	12/31/2018	12/31/2017
Funded Ratio*	56%	58%

* Reflects assets from Surplus divisions, if any.

There has been a change in actuary and actuarial software since the December 31, 2017 valuation. Throughout this report are references to valuation results generated prior to the 2018 valuation date. Results prior to 2018 were received directly from the prior actuary or extracted from the previous valuation system by MERS's technology service provider.

Required Employer Contributions:

Your required employer contributions are shown in the following table. Employee contributions, if any, are in addition to the employer contributions. Changes to the actuarial assumptions and methods based on the 2015 Experience Study are phased-in over a 5-year period. This valuation reflects the fourth 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 you requested and have been billed using No Phase-in rates, your 2019 rates will continue to use the No Phase-in method. If you have been billed using the Phased-in rates and wish to change to rates based on No Phase-in, please contact MERS.

	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:	12/31/2018	12/31/2018	12/31/2017	12/31/2017	12/31/2018	12/31/2018	12/31/2017	12/31/2017
Fiscal Year Beginning:	July 1, 2020	July 1, 2020	July 1, 2019	July 1, 2019	July 1, 2020	July 1, 2020	July 1, 2019	July 1, 2019
Division								
01 - SEIU,DPW,WWTP	-	-	-	-	$ 14,874	$ 15,179	$ 14,058	$ 14,668
02 - Police NSU	-	-	-	-	12,975	13,209	11,097	11,565
10 - Non Union	-	-	-	-	30,133	30,763	27,432	28,692
12 - SEIU Clrcl	-	-	-	-	561	627	261	393
21 - FOP Sprvsn	-	-	-	-	12,613	12,826	11,490	11,916
HA - Police Union After 7/1/2012	0.02%	0.02%	0.45%	0.45%	6	6	148	148
HB - SEIU Union DPW/Cler aft 7/1/12	1.69%	1.69%	2.23%	2.23%	912	912	985	985
HC - Fire & Pol Non-Un aft 4/1/13	4.50%	4.50%	5.29%	5.29%	770	770	902	902
HD - Envir Srv	5.45%	5.45%	-	-	239	239	0	0
Municipality Total					**$ 73,083**	**$ 74,531**	**$ 66,373**	**$ 69,269**

Employee contribution rates:

	Employee Contribution Rate	
Valuation Date:	12/31/2018	12/31/2017
Division		
01 - SEIU,DPW,WWTP	2.25%	2.25%
02 - Police NSU	10.00%	10.00%
10 - Non Union	7.20%	7.20%
12 - SEIU Clrcl	2.25%	2.25%
21 - FOP Sprvsn	13.00%	13.00%
HA - Police Union After 7/1/2012	0.00%	0.00%
HB - SEIU Union DPW/Cler aft 7/1/12	0.00%	0.00%
HC - Fire & Pol Non-Un aft 4/1/13	0.00%	0.00%
HD - Envir Srv	0.00%	0.00%

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 division 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.

Assuming that experience of the plan meets actuarial assumptions:

• To accelerate to a 100% funding ratio in 10 years, estimated monthly employer contributions for the fiscal year beginning in 2020 for the entire employer would be $119,013, instead of $74,531.

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.

Comments on Investment Rate of Return Assumption

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 at least 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 assumed investment return assumptions, please review the "what if" projection scenarios later in this report.

Assumption Change in 2019

At the February 28, 2019 board meeting, the MERS Retirement Board adjusted key economic assumptions. These assumptions, in particular the investment return assumption, have a significant effect on a plan's required contribution and funding level. Historically low interest rates, along with high equity market valuations, have led to reductions in projected returns for most asset classes. This has resulted in a Board adopted reduction in the investment rate of return assumption to 7.35%, effective with the December 31, 2019 valuation first impacting 2021 contributions. The Board also changed the assumed rate of wage inflation from 3.75% to 3.00%, with the same effective date. This report includes a "What If" scenario of 7.35%/3.00% in order to show the potential impact of this assumption change.

Comments on Asset Smoothing

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 2018 was 3.80%, while the actual market rate of return was (4.12)%.** 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 view the "How Smoothing Works" video on the Defined Benefit resource page of the MERS website.

As of December 31, 2018 the actuarial value of assets is 110% 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, 2018 valuation results were based on market value instead of actuarial value:

- The funded percent of your entire municipality would be 51% (instead of 56%); and
- Your total employer contribution requirement for the fiscal year starting July 1, 2020 would be $988,740 (instead of $894,372)

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.

Many assumptions are important in determining the required employer contributions. In the following table, we show the impact of varying the Investment Return assumption and the Wage Inflation assumption. Lower investment returns would result in higher required employer contributions, and vice-versa. Lower wage inflation generally results in lower required employer contributions as a dollar amount in the long run, and vice versa.

The relative impact of each economic 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, 2018 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.

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. Projections are not predictions. Future valuations will be based on actual future experience.

The Retirement Board has adopted a change to the Investment Return Assumption from 7.75% to 7.35%, and the wage inflation from 3.75% to 3.00%. This change will be effective in the December 31, 2019 valuation which will impact the Fiscal Year 2021 contribution. The scenario shown using these assumptions as of December 31, 2018 is illustrative only. The actual impact of this change when reflected in the 2019 valuation will be different.

	Assumed Future Annual Smoothed Rate of Investment Return		
12/31/2018 Valuation Results	**Lower Future Annual Returns**	**Adopted 2019 Assumption**	**Valuation Assumptions**
Investment Return Assumption	**5.75%**	**7.35%**	**7.75%**
Wage Increase Assumption	**3.75%**	**3.00%**	**3.75%**
Accrued Liability	$ 28,487,174	$ 23,769,002	$ 23,006,322
Valuation Assets[1]	$ 12,974,707	$ 12,974,707	$ 12,974,707
Unfunded Accrued Liability	$ 15,512,467	$ 10,794,295	$ 10,031,615
Funded Ratio	46%	55%	56%
Monthly Normal Cost	$ 28,734	$ 14,304	$ 14,508
Monthly Amortization Payment	$ 79,816	$ 66,672	$ 60,023
Total Employer Contribution[2]	$ 108,550	$ 81,060	$ 74,531

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

[2] If assets exceed accrued liabilities for a division, the division may have an overfunding credit 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

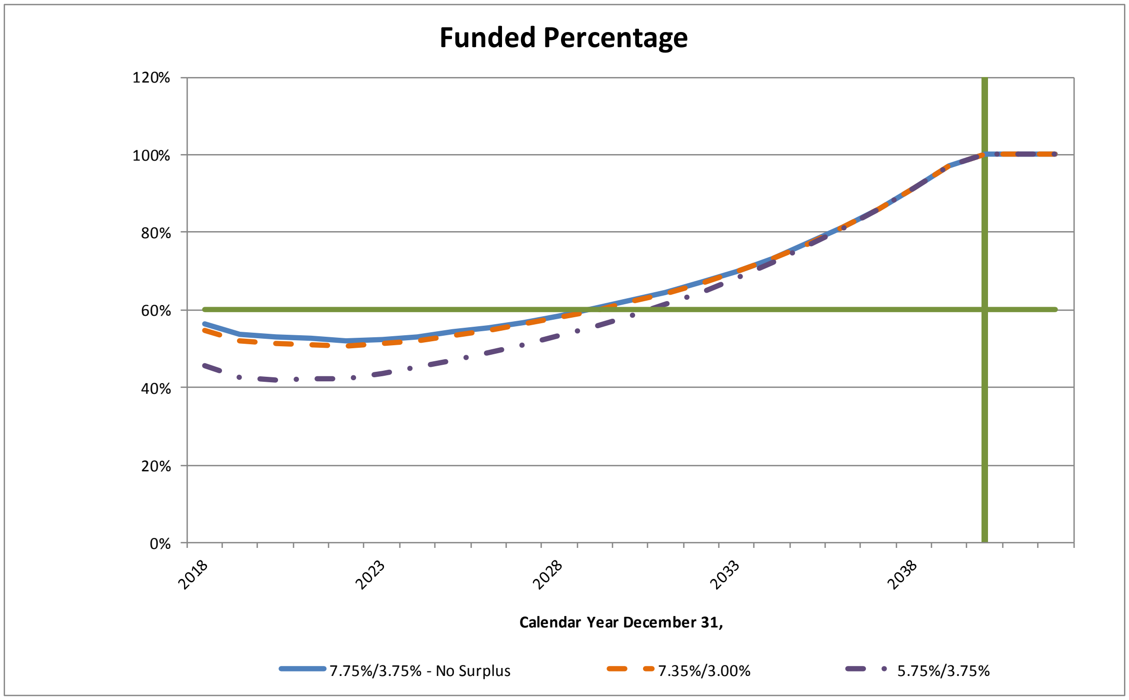
The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate economic scenarios. All three projections take into account the past investment losses that will continue to affect the actuarial rate of return in the short term.

The 7.75%/3.75% scenario provides 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 7.35%/3.00% and 5.75%/3.75% projections provide an indication of the potential required employer contribution if these assumptions were met over the long-term.

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]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 23,006,322	$ 12,974,707	56%	$ 894,372
2019	2021	$ 23,300,000	$ 12,500,000	54%	$ 984,000
2020	2022	$ 23,600,000	$ 12,500,000	53%	$ 1,040,000
2021	2023	$ 23,900,000	$ 12,600,000	53%	$ 1,110,000
2022	2024	$ 24,200,000	$ 12,600,000	52%	$ 1,180,000
2023	2025	$ 24,500,000	$ 12,800,000	52%	$ 1,230,000
7.35%[1]/3.00%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 23,769,002	$ 12,974,707	55%	$ 972,720
2019	2021	$ 24,000,000	$ 12,500,000	52%	$ 1,060,000
2020	2022	$ 24,300,000	$ 12,500,000	51%	$ 1,110,000
2021	2023	$ 24,500,000	$ 12,500,000	51%	$ 1,170,000
2022	2024	$ 24,800,000	$ 12,500,000	50%	$ 1,230,000
2023	2025	$ 25,000,000	$ 12,800,000	51%	$ 1,280,000
5.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 28,487,174	$ 12,974,707	46%	$ 1,302,600
2019	2021	$ 28,800,000	$ 12,300,000	43%	$ 1,410,000
2020	2022	$ 29,200,000	$ 12,300,000	42%	$ 1,480,000
2021	2023	$ 29,500,000	$ 12,500,000	42%	$ 1,560,000
2022	2024	$ 29,900,000	$ 12,700,000	42%	$ 1,640,000
2023	2025	$ 30,300,000	$ 13,200,000	44%	$ 1,710,000

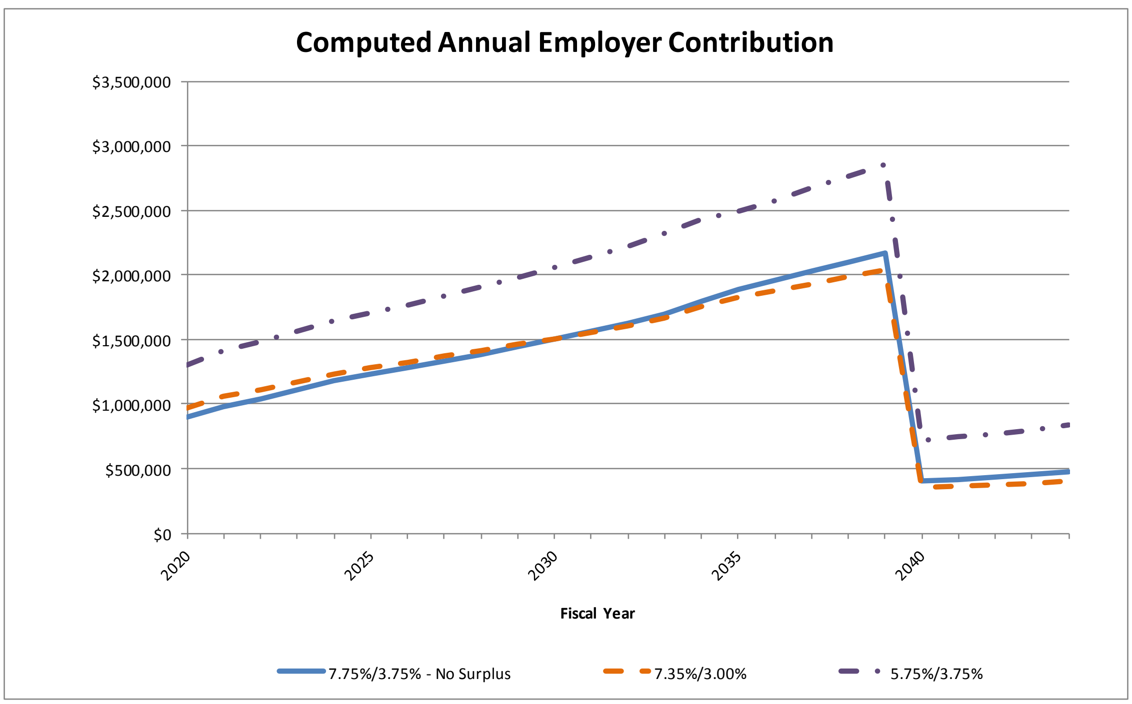
[1] Represents both the interest rate for discounting liabilities and the future investment return assumption on the Market Value of assets.

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



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

The green indicator lines have been added at 60% funded and 22 years following the valuation date for PA 202 purposes.



Notes:
All projected contributions are shown with no phase-in.

Table 1: Employer Contribution Details For the Fiscal Year Beginning July 1, 2020

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 - SEIU,DPW,WWTP	9.90%	2.25%	-	-	-	-	20.48%	20.02%	
02 - Police NSU	15.72%	10.00%	-	-	-	-	34.84%	34.24%	
10 - Non Union	11.92%	7.20%	-	-	-	-	40.80%	39.99%	
12 - SEIU Clrcl	10.52%	2.25%	-	-	-	-	20.48%	20.02%	
21 - FOP Sprvsn	16.75%	13.00%	-	-	-	-	34.84%	34.24%	
HA - Police Union After 7/1/2012	8.78%	0.00%	8.78%	-8.76%	0.02%	0.02%	34.84%	34.24%	0.96%
HB - SEIU Union DPW/Cler aft 7/1/12	5.36%	0.00%	5.36%	-3.67%	1.69%	1.69%	20.48%	20.02%	0.97%
HC - Fire & Pol Non-Un aft 4/1/13	7.74%	0.00%	7.74%	-3.24%	4.50%	4.50%	40.80%	39.99%	0.92%
HD - Envir Srv	5.54%	0.00%	5.54%	-0.09%	5.45%	5.45%			0.88%
Estimated Monthly Contribution[3]									
01 - SEIU,DPW,WWTP			$ 1,792	$ 13,387	$ 15,179	$ 14,874			
02 - Police NSU			963	12,246	13,209	12,975			
10 - Non Union			2,841	27,922	30,763	30,133			
12 - SEIU Clrcl			346	281	627	561			
21 - FOP Sprvsn			731	12,095	12,826	12,613			
HA - Police Union After 7/1/2012			3,373	(3,367)	6	6			
HB - SEIU Union DPW/Cler aft 7/1/12			2,896	(1,984)	912	912			
HC - Fire & Pol Non-Un aft 4/1/13			1,323	(553)	770	770			
HD - Envir Srv			243	(4)	239	239			
Total Municipality			**$ 14,508**	**$ 60,023**	**$ 74,531**	**$ 73,083**			
Estimated Annual Contribution[3]			**$ 174,096**	**$ 720,276**	**$ 894,372**	**$ 876,996**			

[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] 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.

Table 2: Benefit Provisions

01 - SEIU,DPW,WWTP: Closed to new hires, linked to Division HB

	2018 Valuation	2017 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):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.25%	2.25%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

02 - Police NSU: Closed to new hires, linked to Division HA

	2018 Valuation	2017 Valuation
Benefit Multiplier:	3.00% Multiplier (80% max)	3.00% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	10.00%	10.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

10 - Non Union: Closed to new hires, linked to Division HC

	2018 Valuation	2017 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):	55/20	55/20
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	7.20%	7.20%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

12 - SEIU Clrcl: Closed to new hires, linked to Division HB

	2018 Valuation	2017 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):	55/20	55/20
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.25%	2.25%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

21 - FOP Sprvsn: Closed to new hires, linked to Division HA

	2018 Valuation	2017 Valuation
Benefit Multiplier:	3.00% Multiplier (80% max)	3.00% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	13.00%	13.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HA - Police Union After 7/1/2012: Open Division, linked to Division 02, 21

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.75% Multiplier (no max)	Hybrid Plan - 1.75% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HB - SEIU Union DPW/Cler aft 7/1/12: Open Division, linked to Division 01, 12

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.25% Multiplier (no max)	Hybrid Plan - 1.25% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HC - Fire & Pol Non-Un aft 4/1/13: Open Division, linked to Division 10

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.75% Multiplier (no max)	Hybrid Plan - 1.75% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HD - Envir Srv: Open Division

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.25% Multiplier (no max)	-
Normal Retirement Age:	60	-
Vesting:	6 years	-
Early Retirement (Unreduced):	55/25	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	-
Employee Contributions:	0.00%	-
Act 88:	Yes (Adopted 9/9/1968)	-

Table 3: Participant Summary

Division	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2017 Valuation Number	2017 Valuation Annual Payroll[1]	2018 Valuation Average Age	2018 Valuation Average Benefit Service[2]	2018 Valuation Average Eligibility Service[2]
01 - SEIU,DPW,WWTP							
Active Employees	5	$ 279,689	5	$ 266,771	48.8	15.4	15.4
Vested Former Employees	1	8,974	3	16,958	53.4	11.4	29.3
Retirees and Beneficiaries	19	352,104	17	369,102	69.9		
02 - Police NSU							
Active Employees	3	$ 191,531	4	$ 250,304	37.1	13.1	13.9
Vested Former Employees	3	37,789	3	37,789	42.7	7.8	15.5
Retirees and Beneficiaries	14	324,671	12	278,091	66.6		
10 - Non Union							
Active Employees	11	$ 778,551	12	$ 820,575	46.2	17.3	17.3
Vested Former Employees	3	18,143	4	34,990	53.9	6.4	16.1
Retirees and Beneficiaries	30	703,317	28	667,551	66.0		
12 - SEIU Clrcl							
Active Employees	1	$ 49,920	2	$ 95,480	53.2	11.9	11.9
Vested Former Employees	1	15,533	1	15,533	59.5	15.0	15.0
Retirees and Beneficiaries	3	36,936	2	15,730	66.7		
21 - FOP Sprvsn							
Active Employees	3	$ 223,248	3	$ 222,308	42.8	17.0	17.0
Vested Former Employees	1	47,778	1	47,778	56.2	24.3	27.8
Retirees and Beneficiaries	6	200,996	6	200,995	63.3		
HA - Police Union After 7/1/2012							
Active Employees	7	$ 403,138	6	$ 306,669	34.4	2.8	3.9
Vested Former Employees	1	2,957	1	2,957	34.3	3.3	5.2
Retirees and Beneficiaries	0	0	0	0	0.0		
HB - SEIU Union DPW/Cler aft 7/1/12							
Active Employees	14	$ 563,822	11	$ 442,184	33.1	2.7	5.6
Vested Former Employees	1	2,021	1	2,021	54.0	3.6	14.3
Retirees and Beneficiaries	0	0	0	0	0.0		
HC - Fire & Pol Non-Un aft 4/1/13							
Active Employees	1	$ 67,169	1	$ 65,125	30.3	5.7	5.7
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
HD - Envir Srv							
Active Employees	1	$ 48,000	0	$ 0	34.8	0.2	0.2
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
Total Municipality							
Active Employees	**46**	**$ 2,605,068**	**44**	**$ 2,469,416**	**39.4**	**9.4**	**10.5**
Vested Former Employees	**11**	**133,195**	**14**	**158,026**	**49.7**	**9.1**	**16.9**
Retirees and Beneficiaries	**72**	**1,618,024**	**65**	**1,531,469**	**67.0**		
Total Participants	**129**		**123**				

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

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

Table 4: Reported Assets (Market Value)

Division	2018 Valuation		2017 Valuation	
	Employer and Retiree[1]	Employee[2]	Employer and Retiree[1]	Employee[2]
01 - SEIU,DPW,WWTP	$ 1,860,017	$ 68,067	$ 2,255,139	$ 61,476
02 - Police NSU	1,453,754	285,605	1,694,896	351,249
10 - Non Union	4,513,710	535,917	5,088,846	524,000
12 - SEIU Clrcl	555,262	30,891	576,308	46,244
21 - FOP Sprvsn	1,258,884	381,872	1,476,851	343,871
HA - Police Union After 7/1/2012	469,628	0	372,767	0
HB - SEIU Union DPW/Cler aft 7/1/12	337,686	0	243,749	0
HC - Fire & Pol Non-Un aft 4/1/13	93,611	0	74,189	0
HD - Envir Srv	444	0	0	0
Municipality Total[3]	**$ 10,542,996**	**$ 1,302,352**	**$ 11,782,745**	**$ 1,326,840**
Combined Assets[3]	**$11,845,348**		**$13,109,585**	

[1] Reserve for Employer Contributions and Benefit Payments.
[2] Reserve for Employee Contributions.
[3] Totals may not add due to rounding.

The December 31, 2018 valuation assets (actuarial value of assets) are equal to 1.095342 times the reported market value of assets (compared to 1.011321 as of December 31, 2017). Refer to the Appendix for a description of the valuation asset derivation and a detailed calculation of valuation assets.

Table 5: Flow of Valuation Assets

Year Ended 12/31	Employer Contributions		Employee Contributions	Investment Income (Valuation Assets)	Benefit Payments	Employee Contribution Refunds	Net Transfers	Valuation Asset Balance
	Required	Additional						
2008	$ 333,072		$ 120,010	$ 515,389	$ (746,354)	$ 0	$ 0	$ 12,157,694
2009	372,531		145,516	530,509	(810,311)	(2,270)	0	12,393,669
2010	392,668		134,938	647,146	(837,297)	(8,217)	0	12,722,907
2011	390,991	$ 0	143,105	635,427	(938,501)	0	77,570	13,031,499
2012	383,794	0	147,329	557,053	(1,018,163)	0	0	13,101,512
2013	412,929	0	134,946	739,591	(1,130,538)	(12,382)	0	13,246,058
2014	440,591	0	131,690	728,236	(1,237,873)	(144)	0	13,308,558
2015	488,614	0	133,942	619,190	(1,303,433)	0	0	13,246,871
2016	560,878	0	133,756	632,343	(1,353,372)	(33,064)	0	13,187,412
2017	621,969	33,866	125,815	760,918	(1,468,713)	(3,270)	0	13,257,997
2018	667,801	58,215	116,735	466,956	(1,592,997)	0	0	12,974,707

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 Asset balance includes assets from Surplus divisions, if any.

Years where historical information is not available, will be displayed with zero values.

Table 6: Actuarial Accrued Liabilities and Valuation Assets as of December 31, 2018

Division	Actuarial Accrued Liability: Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
01 - SEIU,DPW,WWTP	$ 786,392	$ 88,384	$ 3,424,260	$ 3,405	$ 4,302,441	$ 2,111,911	49.1%	$ 2,190,530
02 - Police NSU	561,136	103,396	3,203,882	20,083	3,888,497	1,905,193	49.0%	1,983,304
10 - Non Union	2,622,592	149,976	7,312,008	0	10,084,576	5,531,068	54.8%	4,553,508
12 - SEIU Clrcl	111,921	168,243	388,688	5,043	673,895	642,038	95.3%	31,857
21 - FOP Sprvsn	962,262	543,997	2,262,373	0	3,768,632	1,797,190	47.7%	1,971,442
HA - Police Union After 7/1/2012	112,446	4,387	0	0	116,833	514,403	440.3%	(397,570)
HB - SEIU Union DPW/Cler aft 7/1/12	120,594	13,634	0	0	134,228	369,882	275.6%	(235,654)
HC - Fire & Pol Non-Un aft 4/1/13	37,220	0	0	0	37,220	102,536	275.5%	(65,316)
HD - Envir Srv	0	0	0	0	0	486	0.0%	(486)
Total	**$ 5,314,563**	**$ 1,072,017**	**$ 16,591,211**	**$ 28,531**	**$ 23,006,322**	**$ 12,974,707**	**56.4%**	**$ 10,031,615**

The following results show the combined accrued liabilities and assets for each set of linked divisions. These results are already shown in the table on the prior page(s).

Table 6 (continued)

Division	Actuarial Accrued Liability					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
Linked Divisions HA, 02, 21	$ 1,635,844	$ 651,780	$ 5,466,255	$ 20,083	$ 7,773,962	$ 4,216,786	54.2%	$ 3,557,176
Linked Divisions HB, 01, 12	1,018,907	270,261	3,812,948	8,448	5,110,564	3,123,831	61.1%	1,986,733
Linked Divisions HC, 10	2,659,812	149,976	7,312,008	0	10,121,796	5,633,604	55.7%	4,488,192

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

Table 7: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2004	$ 12,698,375	$ 10,293,032	81%	$ 2,405,343
2005	13,679,913	10,699,124	78%	2,980,789
2006	14,521,558	11,297,810	78%	3,223,748
2007	15,255,703	11,935,577	78%	3,320,126
2008	16,351,826	12,157,694	74%	4,194,132
2009	16,698,529	12,393,669	74%	4,304,860
2010	17,697,293	12,722,907	72%	4,974,386
2011	18,428,684	13,031,499	71%	5,397,185
2012	18,390,180	13,101,512	71%	5,288,668
2013	18,921,858	13,246,058	70%	5,675,800
2014	20,093,324	13,308,558	66%	6,784,766
2015	21,576,863	13,246,871	61%	8,329,992
2016	22,299,124	13,187,412	59%	9,111,712
2017	22,812,781	13,257,997	58%	9,554,784
2018	23,006,322	12,974,707	56%	10,031,615

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.

Years where historical information is not available will be displayed with zero values.

Tables 8 and 9: Division-Based Comparative Schedules

Division 01 - SEIU,DPW,WWTP

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 3,601,572	$ 2,933,571	81%	$ 668,001
2009	3,732,278	2,949,119	79%	783,159
2010	3,947,965	2,974,050	75%	973,915
2011	3,959,902	2,977,521	75%	982,381
2012	4,078,087	2,955,585	73%	1,122,502
2013	4,131,441	2,954,368	72%	1,177,073
2014	4,203,532	2,803,702	67%	1,399,830
2015	4,388,030	2,641,520	60%	1,746,510
2016	4,469,610	2,501,998	56%	1,967,612
2017	4,503,193	2,342,841	52%	2,160,352
2018	4,302,441	2,111,911	49%	2,190,530

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		
2008	15	$ 682,707	12.01%	2.25%
2009	14	656,730	13.40%	2.25%
2010	14	677,637	14.72%	2.25%
2011	14	629,004	15.66%	2.25%
2012	12	563,786	$ 8,683	2.25%
2013	11	534,485	$ 9,133	2.25%
2014	8	401,454	$ 9,870	2.25%
2015	7	360,834	$ 12,188	2.25%
2016	7	373,112	$ 13,629	2.25%
2017	5	266,771	$ 14,668	2.25%
2018	5	279,689	$ 15,179	2.25%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-02: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 3,158,518	$ 2,040,453	65%	$ 1,118,065
2009	3,123,061	2,146,523	69%	976,538
2010	3,318,148	2,264,712	68%	1,053,436
2011	3,598,162	2,421,310	67%	1,176,852
2012	3,453,258	2,402,869	70%	1,050,389
2013	3,346,230	2,293,153	69%	1,053,077
2014	3,429,783	2,278,542	66%	1,151,241
2015	3,652,176	2,251,099	62%	1,401,077
2016	3,769,514	2,142,975	57%	1,626,539
2017	3,827,152	2,069,309	54%	1,757,843
2018	3,888,497	1,905,193	49%	1,983,304

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

Table 9-02: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	12	$ 605,480	17.26%	6.80%
2009	12	623,618	15.05%	6.80%
2010	10	563,696	17.02%	6.80%
2011	10	541,005	19.19%	6.80%
2012	8	444,899	$ 7,388	8.00%
2013	5	279,414	$ 6,533	9.00%
2014	5	289,048	$ 7,272	10.00%
2015	5	298,189	$ 9,282	10.00%
2016	4	246,247	$ 10,646	10.00%
2017	4	250,304	$ 11,565	10.00%
2018	3	191,531	$ 13,209	10.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Division 10 - Non Union

Table 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 6,788,774	$ 5,364,468	79%	$ 1,424,306
2009	7,054,360	5,390,569	76%	1,663,791
2010	7,451,187	5,459,358	73%	1,991,829
2011	7,747,836	5,494,799	71%	2,253,037
2012	7,601,714	5,513,963	73%	2,087,751
2013	8,250,614	5,793,804	70%	2,456,810
2014	8,772,768	5,842,154	67%	2,930,614
2015	9,497,473	5,757,438	61%	3,740,035
2016	9,785,458	5,667,455	58%	4,118,003
2017	9,973,157	5,676,389	57%	4,296,768
2018	10,084,576	5,531,068	55%	4,553,508

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		
2008	18	$ 1,022,254	13.87%	4.36%
2009	16	937,969	16.50%	4.36%
2010	16	1,013,182	17.63%	4.36%
2011	15	936,509	17.85%	7.20%
2012	14	872,934	19.33%	7.20%
2013	12	724,526	$ 15,487	7.20%
2014	12	742,403	$ 18,577	7.20%
2015	12	765,569	$ 24,709	7.20%
2016	12	797,771	$ 27,187	7.20%
2017	12	820,575	$ 28,692	7.20%
2018	11	778,551	$ 30,763	7.20%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-12: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 526,202	$ 463,775	88%	$ 62,427
2009	514,542	519,955	101%	(5,413)
2010	552,654	579,387	105%	(26,733)
2011	580,295	629,554	109%	(49,259)
2012	629,227	674,085	107%	(44,858)
2013	416,220	453,510	109%	(37,290)
2014	442,969	497,046	112%	(54,077)
2015	518,878	540,838	104%	(21,960)
2016	576,361	586,458	102%	(10,097)
2017	613,524	629,600	103%	(16,076)
2018	673,895	642,038	95%	31,857

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		
2008	5	$ 197,988	8.96%	2.25%
2009	5	195,528	6.82%	2.25%
2010	5	209,134	6.00%	2.25%
2011	5	201,495	4.94%	2.25%
2012	5	202,323	$ 740	2.25%
2013	4	158,417	$ 524	2.25%
2014	3	118,696	$ 68	2.25%
2015	3	127,448	$ 566	2.25%
2016	3	138,946	$ 697	2.25%
2017	2	95,480	$ 393	2.25%
2018	1	49,920	$ 627	2.25%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-21: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 2,276,760	$ 1,355,427	60%	$ 921,333
2009	2,274,288	1,387,503	61%	886,785
2010	2,427,339	1,445,400	60%	981,939
2011	2,542,489	1,508,315	59%	1,034,174
2012	2,628,452	1,552,075	59%	1,076,377
2013	2,769,561	1,703,192	62%	1,066,369
2014	3,200,263	1,740,366	54%	1,459,897
2015	3,431,419	1,774,114	52%	1,657,305
2016	3,560,234	1,826,699	51%	1,733,535
2017	3,716,217	1,841,334	50%	1,874,883
2018	3,768,632	1,797,190	48%	1,971,442

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

Table 9-21: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees Number	Active Employees Annual Payroll	Computed Employer Contribution[1]	Employee Contribution Rate[2]
2008	4	$ 238,583	25.35%	10.03%
2009	4	243,775	23.44%	10.03%
2010	4	262,418	24.24%	10.03%
2011	4	258,489	26.20%	10.03%
2012	4	215,837	$ 6,060	11.00%
2013	4	259,679	$ 6,453	12.00%
2014	4	268,644	$ 8,721	13.00%
2015	4	277,620	$ 10,278	13.00%
2016	4	287,915	$ 10,821	13.00%
2017	3	222,308	$ 11,916	13.00%
2018	3	223,248	$ 12,826	13.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HA: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	(444)	1,647	0%	(2,091)
2013	6,376	33,458	525%	(27,082)
2014	28,652	94,774	331%	(66,122)
2015	48,343	167,309	346%	(118,966)
2016	66,997	260,272	389%	(193,275)
2017	67,130	376,987	562%	(309,857)
2018	116,833	514,403	440%	(397,570)

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

Table 9-HA: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	2	58,827	7.24%	0.00%
2013	5	212,569	6.08%	0.00%
2014	6	272,900	5.00%	0.00%
2015	6	286,193	4.22%	0.00%
2016	6	306,023	2.86%	0.00%
2017	6	306,669	0.45%	0.00%
2018	7	403,138	0.02%	0.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HB: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	(114)	1,288	0%	(1,402)
2013	1,572	9,183	584%	(7,611)
2014	10,772	35,562	330%	(24,790)
2015	28,941	82,631	286%	(53,690)
2016	53,126	150,927	284%	(97,801)
2017	84,681	246,508	291%	(161,827)
2018	134,228	369,882	276%	(235,654)

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

Table 9-HB: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	1	23,363	4.50%	0.00%
2013	4	122,391	5.94%	0.00%
2014	6	198,333	4.44%	0.00%
2015	8	267,410	3.55%	0.00%
2016	10	372,644	3.29%	0.00%
2017	11	442,184	2.23%	0.00%
2018	14	563,822	1.69%	0.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HC: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	(156)	5,390	0%	(5,546)
2014	4,585	16,412	358%	(11,827)
2015	11,603	31,922	275%	(20,319)
2016	17,824	50,628	284%	(32,804)
2017	27,727	75,029	271%	(47,302)
2018	37,220	102,536	275%	(65,316)

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

Table 9-HC: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	1	46,397	6.47%	0.00%
2014	1	53,303	5.19%	0.00%
2015	1	60,253	6.04%	0.00%
2016	1	58,289	5.68%	0.00%
2017	1	65,125	5.29%	0.00%
2018	1	67,169	4.50%	0.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HD: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	0	0	0%	0
2016	0	0	0%	0
2017	0	0	0%	0
2018	0	486	0%	(486)

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

Table 9-HD: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$0.00	0.00%
2009	0	0	$0.00	0.00%
2010	0	0	$0.00	0.00%
2011	0	0	$0.00	0.00%
2012	0	0	$0.00	0.00%
2013	0	0	$0.00	0.00%
2014	0	0	$0.00	0.00%
2015	0	0	$0.00	0.00%
2016	0	0	$0.00	0.00%
2017	0	0	$0.00	0.00%
2018	1	48,000	5.45%	0.00%

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 contributon 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 2.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 10: Division-Based Layered Amortization Schedule

Division 01 - SEIU,DPW,WWTP

Table 10-01: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,746,510	23	$ 1,851,182	20	$ 134,376
(Gain)/Loss	12/31/2016	176,075	22	199,156	20	14,460
(Gain)/Loss	12/31/2017	149,539	21	168,007	20	12,192
(Gain)/Loss	12/31/2018	(4,736)	20	(5,297)	20	(384)
Total				**$ 2,213,048**		**$ 160,644**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-02: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,401,077	23	$ 1,488,610	20	$ 108,060
(Gain)/Loss	12/31/2016	185,752	22	210,092	20	15,252
(Gain)/Loss	12/31/2017	93,290	21	104,817	20	7,608
(Gain)/Loss	12/31/2018	197,495	20	220,893	20	16,032
Total				**$ 2,024,412**		**$ 146,952**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-10: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020 Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 3,740,035	23	$ 3,991,294	20	$ 289,728
(Gain)/Loss	12/31/2016	260,915	22	295,112	20	21,420
(Gain)/Loss	12/31/2017	88,952	21	99,938	20	7,260
(Gain)/Loss	12/31/2018	205,104	20	229,404	20	16,656
Total				**$ 4,615,748**		**$ 335,064**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-12: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020 Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2018	$ 33,922	15	$ 37,941	15	$ 3,372
Total				**$ 37,941**		**$ 3,372**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-21: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,657,305	23	$ 1,753,903	20	$ 127,320
(Gain)/Loss	12/31/2016	31,774	22	35,931	20	2,604
(Gain)/Loss	12/31/2017	115,134	21	129,360	20	9,396
(Gain)/Loss	12/31/2018	71,683	20	80,176	20	5,820
Total				**$ 1,999,370**		**$ 145,140**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HA: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020 Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (118,966)	10	$ (103,181)	10	$ (12,624)
(Gain)/Loss	12/31/2016	(72,985)	15	(78,829)	13	(7,824)
(Gain)/Loss	12/31/2017	(114,187)	15	(125,814)	14	(11,784)
(Gain)/Loss	12/31/2018	(82,064)	15	(91,787)	15	(8,172)
Total				**$ (399,611)**		**$ (40,404)**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HB: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (53,690)	10	$ (49,603)	10	$ (6,072)
(Gain)/Loss	12/31/2016	(40,378)	15	(43,612)	13	(4,320)
(Gain)/Loss	12/31/2017	(62,069)	15	(68,387)	14	(6,408)
(Gain)/Loss	12/31/2018	(70,374)	15	(78,712)	15	(7,008)
Total				**$ (240,314)**		**$ (23,808)**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HC: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (20,319)	10	$ (17,014)	10	$ (2,076)
(Gain)/Loss	12/31/2016	(12,685)	15	(13,704)	13	(1,356)
(Gain)/Loss	12/31/2017	(14,328)	15	(15,785)	14	(1,476)
(Gain)/Loss	12/31/2018	(17,412)	15	(19,475)	15	(1,728)
Total				**$ (65,978)**		**$ (6,636)**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HD: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2018	$ (485)	15	$ (543)	15	$ (48)
Total				**$ (543)**		**$ (48)**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

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 http://www.mersofmich.com/.

Actuarial Valuation Date:	12/31/2018
Measurement Date of the Total Pension Liability (TPL):	12/31/2018

At 12/31/2018, the following employees were covered by the benefit terms:

Inactive employees or beneficiaries currently receiving benefits:	72
Inactive employees entitled to but not yet receiving benefits (including refunds):	14
Active employees:	46
	132

Total Pension Liability as of 12/31/2017 measurement date:	$	22,252,839
Total Pension Liability as of 12/31/2018 measurement date:	$	22,446,387
Service Cost for the year ending on the 12/31/2018 measurement date:	$	252,828
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(192,904)
- 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.

Average expected remaining service lives of all employees (active and inactive):		4
Covered employee payroll: (Needed for Required Supplementary Information)	$	2,605,068

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 12/31/2018:	$ 2,391,080	$ -	$ (2,015,340)

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 - SEIU,DPW,WWTP

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
2/1/2008	Member Contribution Rate 2.25%
7/1/2007	Benefit B-3 (80% max)
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/8/1996	Blanket Resolution (All Service)
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1994	Member Contribution Rate 0.00%
7/1/1992	Benefit F55 (With 25 Years of Service)
7/1/1992	Member Contribution Rate 5.00%
1/1/1992	Benefit B-2
1/1/1992	Member Contribution Rate 3.00%
12/1/1990	Temporary Benefit B-1 (12/01/1990 - 02/03/1991)
1/1/1984	E 2% COLA Adopted (01/01/1984)
7/1/1976	Member Contribution Rate 0.00%
9/9/1968	Covered by Act 88
7/1/1967	Benefit C-1 (Old)
1/1/1950	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1950	10 Year Vesting
1/1/1950	Benefit C (Old)
1/1/1950	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

02 - Police NSU

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2014	Member Contribution Rate 10.00%
7/1/2013	Member Contribution Rate 9.00%
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Member Contribution Rate 8.00%
7/1/2005	3.0% Multiplier (80% max)
7/1/2005	Member Contribution Rate 6.80%
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/1/1997	Benefit F50 (With 25 Years of Service)
7/1/1997	Member Contribution Rate 5.80%
7/8/1996	Blanket Resolution (All Service)
7/1/1996	Benefit B-4 (80% max)

02 - Police NSU

7/1/1996	Member Contribution Rate 3.91%
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1994	Member Contribution Rate 0.00%
7/1/1993	Member Contribution Rate 1.00%
7/1/1992	Member Contribution Rate 3.00%
7/1/1991	Member Contribution Rate 4.00%
1/1/1991	Benefit B-2
7/1/1990	Member Contribution Rate 2.00%
1/1/1990	Benefit F55 (With 25 Years of Service)
1/1/1984	E 2% COLA Adopted (01/01/1984)
7/1/1976	Member Contribution Rate 0.00%
9/9/1968	Covered by Act 88
7/1/1967	Benefit B-1
1/1/1950	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1950	10 Year Vesting
1/1/1950	Benefit B
1/1/1950	Member Contribution Rate 5.00%
1/1/1950	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 - Non Union

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2011	Member Contribution Rate 7.20%
6/1/2009	Temporary 8 Year Vesting (06/01/2009 - 07/31/2009)
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2003	Benefit B-4 (80% max)
1/1/2003	Member Contribution Rate 4.36%
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/1/1998	Benefit B-3 (80% max)
7/1/1998	Member Contribution Rate 2.25%
7/8/1996	Blanket Resolution (All Service)
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1991	Benefit B-2
7/1/1989	Benefit F55 (With 20 Years of Service)
7/1/1989	Member Contribution Rate 0.00%
10/1/1988	Benefit FAC-5 (5 Year Final Average Compensation)
10/1/1988	Member Contribution Rate 2.00%
1/1/1984	E 2% COLA Adopted (01/01/1984)
12/1/1970	10 Year Vesting
9/9/1968	Covered by Act 88
1/1/1950	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 - SEIU Clrcl

12/1/2016	Service Credit Purchase Estimates - Yes

12 - SEIU Clrcl

7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2003	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/2003	10 Year Vesting
1/1/2003	Benefit B-3 (80% max)
1/1/2003	Benefit F55 (With 20 Years of Service)
1/1/2003	Member Contribution Rate 2.25%
7/8/1996	Blanket Resolution (All Service)
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

21 - FOP Sprvsn

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2014	Member Contribution Rate 13.00%
7/1/2013	Member Contribution Rate 12.00%
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Member Contribution Rate 11.00%
7/1/2006	3.0% Multiplier (80% max)
7/1/2006	Member Contribution Rate 10.03%
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
8/1/1998	Temporary 25 Years & Out (08/01/1998 - 10/02/1998)
7/1/1997	Benefit B-4 (80% max)
7/1/1997	Member Contribution Rate 7.73%
7/8/1996	Blanket Resolution (All Service)
7/1/1996	Benefit F50 (With 25 Years of Service)
7/1/1996	Member Contribution Rate 3.07%
7/1/1995	Member Contribution Rate 0.00%
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1992	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1992	10 Year Vesting
7/1/1992	Benefit B-2
7/1/1991	Member Contribution Rate 4.00%
7/1/1990	Member Contribution Rate 2.00%
1/1/1990	Benefit F55 (With 25 Years of Service)
1/1/1990	Member Contribution Rate 1.00%
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

HA - Police Union After 7/1/2012

7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2012	6 Year Vesting

HA - Police Union After 7/1/2012

7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	1.75% Multiplier
7/1/2012	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HB - SEIU Union DPW/Cler aft 7/1/12

7/1/2012	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2012	6 Year Vesting
7/1/2012	1.25% Multiplier
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HC - Fire & Pol Non-Un aft 4/1/13

4/1/2013	Exclude Temporary Employees requiring less than 12 months
4/1/2013	Benefit FAC-3 (3 Year Final Average Compensation)
4/1/2013	6 Year Vesting
4/1/2013	1.75% Multiplier
4/1/2013	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HD - Envir Srv

11/1/2018	Benefit FAC-3 (3 Year Final Average Compensation)
11/1/2018	6 Year Vesting
11/1/2018	Day of work defined as ten 8 hour days for all EEs
11/1/2018	Defined Benefit Normal Retirement Age - 60
11/1/2018	Medicare Taxable Wages
11/1/2018	1.25% Multiplier
11/1/2018	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July

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	2.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	100%

Miscellaneous and Technical Assumptions

Loads – None.

Risk Commentary

Determination of the accrued liability, the employer contribution, and the funded ratio requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability, the actuarially determined contribution and the funded ratio that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

- **Investment Risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other Demographic Risks –** members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

  The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

1.	Ratio of the market value of assets to total payroll	4.5
2.	Ratio of actuarial accrued liability to payroll	8.8
3.	Ratio of actives to retirees and beneficiaries	0.6
4.	Ratio of market value of assets to benefit payments	7.4
5.	Ratio of net cash flow to market value of assets (boy)	-5.7%

RATIO OF MARKET VALUE OF ASSETS TO TOTAL PAYROLL

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

RATIO OF MARKET VALUE OF ASSETS TO BENEFIT PAYMENTS

The MERS' Actuarial Policy requires a total minimum contribution equal to the excess (if any) of three times the expected annual benefit payments over the projected market value of assets as of the participating municipality or court's Fiscal Year for which the contribution applies. The ratio of market value of assets to benefit payments as of the valuation date provides an indication of whether the division is at risk for triggering the minimum contribution rule in the near term. If the division triggers this minimum contribution rule, the required employer contributions could increase dramatically relative to previous valuations.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

State Reporting

The following information has been prepared to provide some of the information necessary to complete the pension reporting requirements for the State of Michigan's Local Government Retirement System Annual Report (Form No. 5572). Additional resources are available at www.mersofmich.com and on the State website.

Form 5572 Line Reference	Description	Result
10	**Membership as of December 31, 2018**	
11	Indicate number of active members	46
12	Indicate number of inactive members	11
13	Indicate number of retirees and beneficiaries	72
14	**Investment Performance for Calendar Year Ending December 31, 2018[1]**	
15	Enter actual rate of return - prior 1-year period	-3.64%
16	Enter actual rate of return - prior 5-year period	4.94%
17	Enter actual rate of return - prior 10-year period	8.25%
18	**Actuarial Assumptions**	
19	Actuarial assumed rate of investment return[2]	7.75%
20	Amortization method utilized for funding the system's unfunded actuarial accrued liability, if any	Level Percent
21	Amortization period utilized for funding the system's unfunded actuarial accrued liability, if any[3]	20
22	Is each division within the system closed to new employees?[4]	No
23	**Uniform Assumptions**	
24	Enter retirement pension system's actuarial value of assets using uniform assumptions	$12,974,707
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$24,837,467
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending June 30,2019	$987,852

1. The Municipal Employees' Retirement System's investment performance has been provided to GRS from MERS Investment Staff and included here for reporting purposes. This investment performance figures reported are net of fees on a rolling calendar-year basis for the previous 1-, 5-, and 10-year periods as required under PA 530.
2. Net of administrative and investment expenses.
3. Populated with the longest amortization period remaining in the amortization schedule, across all divisions in the plan. This is when each division and the plan in total is expected to reach 100% funded if all assumptions are met.
4. If all divisions within the employer are closed, "yes." If at least one division is open (including shadow divisions) indicate "no."