



Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2018 - Holly Vlg of (6317)





Spring, 2019

Holly Vlg 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 Holly Vlg of (6317) 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. Holly Vlg 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.

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 Holly Vlg 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.



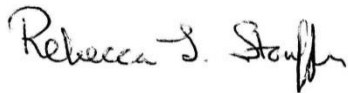
This report was prepared at the request of the MERS Retirement Board and may be provided only in its entirety by the municipality to other interested parties (MERS customarily provides the full report on request to associated third parties such as the auditor for the municipality). GRS is not responsible 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, FSA, FCA, EA, MAAA



Rebecca L. Stouffer, ASA, FCA, MAAA



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*	48%	51%

* 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 - DPW&Clerical	-	-	-	-	\$ 32,521	\$ 33,180	\$ 27,510	\$ 28,828
10 - Police/Disp	-	-	-	-	26,057	26,564	23,381	24,395
11 - Dept Heads	20.98%	21.14%	19.67%	20.08%	7,047	7,101	5,226	5,334
12 - DPW/Ctrl/Nonunion aftr 7/1/13	0.00%	0.00%	0.00%	0.00%	0	0	0	0
20 - Police Off & Comm. staff	0.00%	0.00%	0.00%	0.00%	0	0	0	0
Municipality Total					\$ 65,625	\$ 66,845	\$ 56,117	\$ 58,557

Employee contribution rates:

Valuation Date:	Employee Contribution Rate	
	12/31/2018	12/31/2017
Division		
01 - DPW&Clerical	1.50%	0.00%
10 - Police/Disp	1.50%	0.00%
11 - Dept Heads	0.00%	0.00%
12 - DPW/Ctrl/Nonunion aftr 7/1/13	1.50%	0.00%
20 - Police Off & Comm. staff	1.50%	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 \$103,534, instead of \$66,845.

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 44% (instead of 48%); and
- Your total employer contribution requirement for the fiscal year starting July 1, 2020 would be \$845,988 (instead of \$802,140)

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.

12/31/2018 Valuation Results	Assumed Future Annual Smoothed Rate of Investment Return		
	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	\$ 18,760,956	\$ 15,613,249	\$ 15,078,616
Valuation Assets ¹	\$ 7,306,322	\$ 7,306,322	\$ 7,306,322
Unfunded Accrued Liability	\$ 11,454,634	\$ 8,306,927	\$ 7,772,294
Funded Ratio	39%	47%	48%
Monthly Normal Cost	\$ 25,005	\$ 15,892	\$ 15,868
Monthly Amortization Payment	\$ 57,509	\$ 50,350	\$ 45,581
Total Employer Contribution²	\$ 84,517	\$ 71,684	\$ 66,845

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

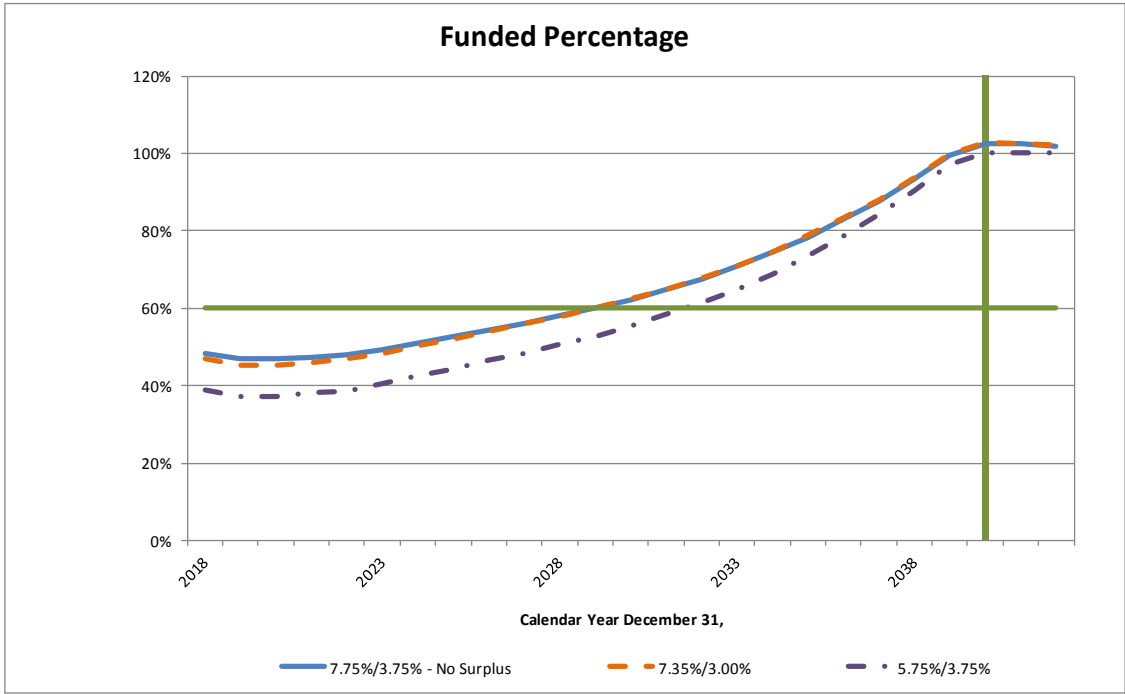
The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate economic scenarios. All three projections take into account the past investment losses that will continue to affect the actuarial rate 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	\$ 15,078,616	\$ 7,306,322	48%	\$ 802,140
2019	2021	\$ 15,400,000	\$ 7,230,000	47%	\$ 856,000
2020	2022	\$ 15,800,000	\$ 7,410,000	47%	\$ 890,000
2021	2023	\$ 16,200,000	\$ 7,690,000	47%	\$ 924,000
2022	2024	\$ 16,600,000	\$ 7,950,000	48%	\$ 963,000
2023	2025	\$ 17,000,000	\$ 8,360,000	49%	\$ 993,000
7.35%¹/3.00%					
NO 5-YEAR PHASE-IN					
2018	2020	\$ 15,613,249	\$ 7,306,322	47%	\$ 860,208
2019	2021	\$ 15,900,000	\$ 7,200,000	45%	\$ 911,000
2020	2022	\$ 16,300,000	\$ 7,380,000	45%	\$ 941,000
2021	2023	\$ 16,700,000	\$ 7,690,000	46%	\$ 971,000
2022	2024	\$ 17,000,000	\$ 7,980,000	47%	\$ 1,010,000
2023	2025	\$ 17,400,000	\$ 8,400,000	48%	\$ 1,030,000
5.75%¹/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	\$ 18,760,956	\$ 7,306,322	39%	\$ 1,014,204
2019	2021	\$ 19,100,000	\$ 7,090,000	37%	\$ 1,070,000
2020	2022	\$ 19,500,000	\$ 7,240,000	37%	\$ 1,120,000
2021	2023	\$ 19,900,000	\$ 7,590,000	38%	\$ 1,160,000
2022	2024	\$ 20,400,000	\$ 7,890,000	39%	\$ 1,210,000
2023	2025	\$ 20,800,000	\$ 8,420,000	40%	\$ 1,240,000

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

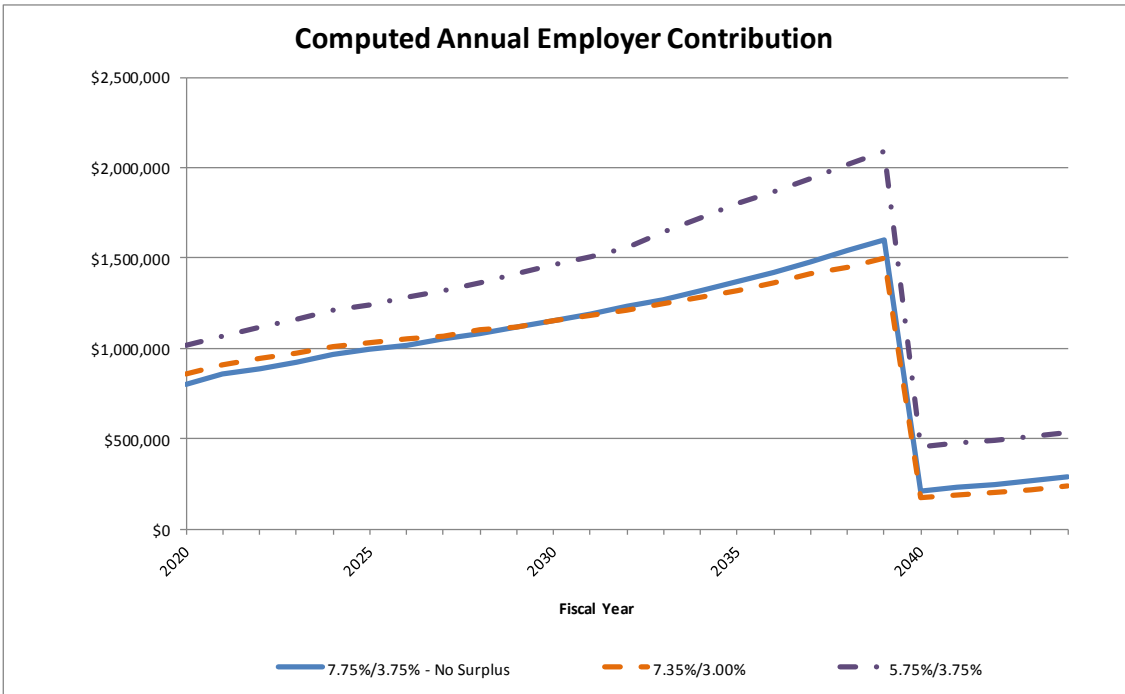
² Valuation Assets do not include assets from Surplus divisions, if any.



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 - DPW&Clerical	13.11%	1.50%	-	-	-	-	53.26%	52.09%	
10 - Police/Disp	13.72%	1.50%	-	-	-	-	57.82%	56.61%	
11 - Dept Heads	20.66%	0.00%	20.66%	0.48%	21.14%	20.98%			0.95%
12 - DPW/Ctrl/Nonunion aftr 7/1/13	6.70%	1.50%	5.20%	-14.65%	0.00%	0.00%	53.26%	52.09%	0.88%
20 - Police Off & Comm. staff	8.38%	1.50%	6.88%	-24.66%	0.00%	0.00%	57.82%	56.61%	0.82%
Estimated Monthly Contribution³									
01 - DPW&Clerical			\$ 2,873	\$ 30,307	\$ 33,180	\$ 32,521			
10 - Police/Disp			3,473	23,091	26,564	26,057			
11 - Dept Heads			6,941	160	7,101	7,047			
12 - DPW/Ctrl/Nonunion aftr 7/1/13			1,659	(4,672)	0	0			
20 - Police Off & Comm. staff			922	(3,305)	0	0			
Total Municipality			\$ 15,868	\$ 45,581	\$ 66,845	\$ 65,625			
Estimated Annual Contribution³			\$ 190,416	\$ 546,972	\$ 802,140	\$ 787,500			

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 - DPW&Clerical: Closed to new hires, linked to Division 12

	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):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	1.50%	0.00%
Act 88:	Yes (Adopted 11/24/1970)	Yes (Adopted 11/24/1970)

10 - Police/Disp: Closed to new hires, linked to Division 20

	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):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	1.50%	0.00%
Act 88:	Yes (Adopted 11/24/1970)	Yes (Adopted 11/24/1970)

11 - Dept Heads: Open Division

	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):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/24/1970)	Yes (Adopted 11/24/1970)

12 - DPW/Ctrl/Nonunion aftr 7/1/13: Open Division, linked to Division 01

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	1.50% Multiplier (no 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:	1.50%	0.00%
Act 88:	Yes (Adopted 11/24/1970)	Yes (Adopted 11/24/1970)

20 - Police Off & Comm. staff: Open Division, linked to Division 10

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	1.50% Multiplier (no 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:	1.50%	0.00%
Act 88:	Yes (Adopted 11/24/1970)	Yes (Adopted 11/24/1970)

Table 3: Participant Summary

Division	2018 Valuation		2017 Valuation		2018 Valuation		
	Number	Annual Payroll ¹	Number	Annual Payroll ¹	Average Age	Average Benefit Service ²	Average Eligibility Service ²
01 - DPW&Clerical							
Active Employees	5	\$ 289,921	5	\$ 271,229	52.2	20.6	20.6
Vested Former Employees	3	30,765	3	30,765	42.4	9.8	12.9
Retirees and Beneficiaries	24	591,691	24	576,084	68.4		
10 - Police/Disp							
Active Employees	5	\$ 325,850	5	\$ 319,127	45.0	17.6	17.6
Vested Former Employees	1	13,313	1	13,313	41.7	10.8	14.6
Retirees and Beneficiaries	11	393,683	11	385,996	66.4		
11 - Dept Heads							
Active Employees	5	\$ 367,624	4	\$ 290,646	57.1	5.5	29.8
Vested Former Employees	1	9,651	1	9,651	54.1	5.9	20.4
Retirees and Beneficiaries	0	0	0	0	0.0		
12 - DPW/Ctrl/Nonunion aftr 7/1/13							
Active Employees	7	\$ 329,932	6	\$ 249,010	39.5	3.6	3.7
Vested Former Employees	1	5,578	1	5,578	41.6	7.0	10.5
Retirees and Beneficiaries	0	0	0	0	0.0		
20 - Police Off & Comm. staff							
Active Employees	2	\$ 131,819	2	\$ 102,600	50.6	2.3	3.1
Vested Former Employees	2	15,662	2	15,662	39.8	8.5	10.8
Retirees and Beneficiaries	0	0	0	0	0.0		
Total Municipality							
Active Employees	24	\$ 1,445,146	22	\$ 1,232,612	47.9	10.3	15.5
Vested Former Employees	8	74,969	8	74,969	43.0	8.8	13.2
Retirees and Beneficiaries	35	985,374	35	962,080	67.8		
Total Participants	67		65				

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 - DPW&Clerical	\$ 2,986,637	\$ 5,295	\$ 3,570,701	\$ 3,486
10 - Police/Disp	2,138,626	1,938	2,447,770	0
11 - Dept Heads	528,777	0	483,151	0
12 - DPW/Ctrl/Nonunion aftr 7/1/13	604,351	2,008	443,165	0
20 - Police Off & Comm. staff	402,053	673	350,921	0
Municipality Total³	\$ 6,660,443	\$ 9,914	\$ 7,295,708	\$ 3,486
Combined Assets³	\$6,670,357		\$7,299,194	

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	\$ 254,586		\$ 0	\$ 322,176	\$ (465,434)	\$ 0	\$ 0	\$ 7,627,317
2009	230,959		0	267,254	(565,734)	0	0	7,559,796
2010	262,252		0	346,675	(636,482)	0	0	7,532,241
2011	279,635	\$ 0	0	321,265	(747,497)	0	0	7,385,644
2012	322,869	0	0	278,284	(792,229)	0	0	7,194,568
2013	392,915	77,616	0	394,809	(804,898)	0	0	7,255,010
2014	580,400	0	0	404,756	(843,831)	0	0	7,396,335
2015	546,242	0	0	353,773	(834,266)	0	0	7,462,084
2016	476,580	0	0	351,398	(902,403)	0	0	7,387,659
2017	508,093	0	0	420,148	(934,072)	0	0	7,381,828
2018	633,522	0	6,336	265,662	(981,026)	0	0	7,306,322

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					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
01 - DPW&Clerical	\$ 1,661,297	\$ 134,065	\$ 6,386,572	\$ 3,577	\$ 8,185,511	\$ 3,277,188	40.0%	\$ 4,908,323
10 - Police/Disp	1,523,604	43,580	4,531,923	0	6,099,107	2,344,649	38.4%	3,754,458
11 - Dept Heads	527,729	78,760	0	0	606,489	579,191	95.5%	27,298
12 - DPW/Ctrl/Nonunion aftr 7/1/13	109,689	15,091	0	0	124,780	664,170	532.3%	(539,390)
20 - Police Off & Comm. staff	27,784	34,945	0	0	62,729	441,124	703.2%	(378,395)
Total	\$ 3,850,103	\$ 306,441	\$ 10,918,495	\$ 3,577	\$ 15,078,616	\$ 7,306,322	48.5%	\$ 7,772,294

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 12, 01	\$ 1,770,986	\$ 149,156	\$ 6,386,572	\$ 3,577	\$ 8,310,291	\$ 3,941,358	47.4%	\$ 4,368,933
Linked Divisions 20, 10	1,551,388	78,525	4,531,923	0	6,161,836	2,785,773	45.2%	3,376,063

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	\$ 8,277,906	\$ 6,019,341	73%	\$ 2,258,565
2005	8,698,835	6,527,802	75%	2,171,033
2006	9,108,013	7,050,695	77%	2,057,318
2007	9,840,813	7,515,989	76%	2,324,824
2008	10,782,188	7,627,317	71%	3,154,871
2009	11,081,772	7,559,796	68%	3,521,976
2010	11,836,411	7,532,241	64%	4,304,170
2011	12,187,273	7,385,644	61%	4,801,629
2012	12,280,556	7,194,568	59%	5,085,988
2013	12,726,555	7,255,010	57%	5,471,545
2014	12,915,696	7,396,335	57%	5,519,361
2015	13,970,884	7,462,084	53%	6,508,800
2016	14,292,510	7,387,659	52%	6,904,851
2017	14,532,992	7,381,828	51%	7,151,164
2018	15,078,616	7,306,322	48%	7,772,294

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 - DPW&Clerical

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	\$ 6,666,739	\$ 4,625,026	69%	\$ 2,041,713
2009	6,829,503	4,600,655	67%	2,228,848
2010	7,286,340	4,596,924	63%	2,689,416
2011	7,561,457	4,514,764	60%	3,046,693
2012	7,411,715	4,364,444	59%	3,047,271
2013	7,515,114	4,260,957	57%	3,254,157
2014	7,389,776	4,173,228	57%	3,216,548
2015	7,904,219	4,051,661	51%	3,852,558
2016	7,949,279	3,839,389	48%	4,109,890
2017	7,955,097	3,614,650	45%	4,340,447
2018	8,185,511	3,277,188	40%	4,908,323

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	14	\$ 703,904	29.15%	0.00%
2009	14	698,464	30.80%	0.00%
2010	11	532,057	41.83%	0.00%
2011	12	579,388	43.50%	0.00%
2012	9	477,333	53.45%	0.00%
2013	7	334,517	\$ 19,971	0.00%
2014	7	348,874	\$ 20,483	0.00%
2015	7	343,475	\$ 25,743	0.00%
2016	5	258,142	\$ 26,751	0.00%
2017	5	271,229	\$ 28,828	0.00%
2018	5	289,921	\$ 33,180	1.50%

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 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 - Police/Disp

Table 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	\$ 4,115,449	\$ 3,002,291	73%	\$ 1,113,158
2009	4,252,269	2,959,141	70%	1,293,128
2010	4,550,071	2,935,317	65%	1,614,754
2011	4,625,816	2,870,880	62%	1,754,936
2012	4,868,841	2,830,124	58%	2,038,717
2013	4,916,510	2,826,551	58%	2,089,959
2014	5,119,554	2,794,770	55%	2,324,784
2015	5,642,295	2,716,054	48%	2,926,241
2016	5,795,036	2,569,448	44%	3,225,588
2017	5,942,158	2,475,481	42%	3,466,677
2018	6,099,107	2,344,649	38%	3,754,458

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	10	\$ 530,799	23.82%	0.00%
2009	9	465,535	28.39%	0.00%
2010	8	422,696	34.24%	0.00%
2011	8	391,290	38.48%	0.00%
2012	8	441,344	41.33%	0.00%
2013	6	318,218	\$ 13,982	0.00%
2014	6	345,626	\$ 15,971	0.00%
2015	5	297,229	\$ 20,277	0.00%
2016	5	310,070	\$ 22,442	0.00%
2017	5	319,127	\$ 24,395	0.00%
2018	5	325,850	\$ 26,564	1.50%

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 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 11 - Dept Heads

Table 8-11: 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	143,705	78,490	55%	65,215
2014	214,160	142,718	67%	71,442
2015	294,672	211,947	72%	82,725
2016	377,266	292,235	78%	85,031
2017	506,125	488,621	97%	17,504
2018	606,489	579,191	95%	27,298

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		
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	4	262,786	21.06%	0.00%
2014	4	279,149	20.79%	0.00%
2015	4	277,449	21.90%	0.00%
2016	4	289,108	21.83%	0.00%
2017	4	290,646	20.08%	0.00%
2018	5	367,624	21.14%	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 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 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 12 - DPW/Ctrl/Nonunion aftr 7/1/13

Table 8-12: 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	47,562	37,250	78%	10,312
2014	66,506	138,483	208%	(71,977)
2015	68,987	265,307	385%	(196,320)
2016	94,999	408,051	430%	(313,052)
2017	84,540	448,182	530%	(363,642)
2018	124,780	664,170	532%	(539,390)

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	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	3	138,018	6.71%	0.00%
2014	4	168,372	2.06%	0.00%
2015	5	199,605	0.00%	0.00%
2016	6	258,190	0.00%	0.00%
2017	6	249,010	0.00%	0.00%
2018	7	329,932	0.00%	1.50%

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 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 20 - Police Off & Comm. staff

Table 8-20: 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	103,664	51,762	50%	51,902
2014	125,700	147,136	117%	(21,436)
2015	60,711	217,115	358%	(156,404)
2016	75,930	278,536	367%	(202,606)
2017	45,072	354,894	787%	(309,822)
2018	62,729	441,124	703%	(378,395)

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

Table 9-20: 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	3	184,376	8.15%	0.00%
2014	3	180,009	4.67%	0.00%
2015	1	60,292	0.00%	0.00%
2016	2	118,032	0.00%	0.00%
2017	2	102,600	0.00%	0.00%
2018	2	131,819	0.00%	1.50%

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 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 - DPW&Clerical

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	\$ 3,852,558	23	\$ 4,075,621	20	\$ 295,848
(Gain)/Loss	12/31/2016	159,176	22	180,031	20	13,068
(Gain)/Loss	12/31/2017	159,255	21	178,933	20	12,984
(Gain)/Loss	12/31/2018	514,758	20	575,743	20	41,796
Amendment	12/31/2018	(86)	20	(96)	20	(12)
Total				\$ 5,010,232		\$ 363,684

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.

Division 10 - Police/Disp

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	\$ 2,926,241	23	\$ 3,109,671	20	\$ 225,732
(Gain)/Loss	12/31/2016	217,459	22	245,963	20	17,856
(Gain)/Loss	12/31/2017	173,109	21	194,495	20	14,124
(Gain)/Loss	12/31/2018	242,296	20	271,002	20	19,668
Amendment	12/31/2018	(3,499)	20	(3,914)	20	(288)
Total				\$ 3,817,217		\$ 277,092

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.

Division 11 - Dept Heads

Table 10-11: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance ¹	Original Amortization Period ²	Amounts for Fiscal Year Beginning 7/1/2020		
				Outstanding UAL Balance ³	Remaining Amortization Period ²	Annual Amortization Payment
Initial	12/31/2015	\$ 82,725	23	\$ 90,126	20	\$ 6,540
(Gain)/Loss	12/31/2016	(1,296)	22	(1,463)	20	(108)
(Gain)/Loss	12/31/2017	(69,829)	21	(78,461)	20	(5,700)
(Gain)/Loss	12/31/2018	14,581	20	16,309	20	1,188
Total				\$ 26,511		\$ 1,920

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.

Division 12 - DPW/Ctrl/Nonunion aftr 7/1/13

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
Initial	12/31/2015	\$ (196,320)	10	\$ (183,610)	10	\$ (22,464)
(Gain)/Loss	12/31/2016	(107,617)	15	(116,235)	13	(11,532)
(Gain)/Loss	12/31/2017	(43,067)	15	(47,454)	14	(4,452)
(Gain)/Loss	12/31/2018	(170,283)	15	(190,457)	15	(16,944)
Amendment	12/31/2018	(4,930)	10	(5,514)	10	(672)
Total				\$ (543,270)		\$ (56,064)

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.

Division 20 - Police Off & Comm. staff

Table 10-20: 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	\$ (156,404)	10	\$ (165,325)	10	\$ (20,220)
(Gain)/Loss	12/31/2016	(33,176)	15	(35,837)	13	(3,552)
(Gain)/Loss	12/31/2017	(95,530)	15	(105,261)	14	(9,864)
(Gain)/Loss	12/31/2018	(58,860)	15	(65,833)	15	(5,856)
Amendment	12/31/2018	(1,227)	10	(1,372)	10	(168)
Total				\$ (373,628)		\$ (39,660)

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:	35
Inactive employees entitled to but not yet receiving benefits (including refunds):	9
Active employees:	<u>24</u>
	68
Total Pension Liability as of 12/31/2017 measurement date:	\$ 14,164,734
Total Pension Liability as of 12/31/2018 measurement date:	\$ 14,701,299
Service Cost for the year ending on the 12/31/2018 measurement date:	\$ 175,024
Change in the Total Pension Liability due to:	
- Benefit changes ¹ :	\$ (9,870)
- Differences between expected and actual experience ² :	\$ 251,499
- Changes in assumptions ² :	\$ 0

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

²Changes 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):	3
Covered employee payroll: (Needed for Required Supplementary Information)	\$ 1,445,146

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

	1% Decrease <u>(7.00%)</u>	Current Discount Rate <u>(8.00%)</u>	1% Increase <u>(9.00%)</u>
Change in Net Pension Liability as of 12/31/2018: \$	1,609,730	-	\$ (1,363,884)

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 - DPW&Clerical

7/1/2018	Participant Contribution Rate 1.5%
12/1/2016	Service Credit Purchase Estimates - No
7/1/2003	Benefit B-4 (80% max)
1/1/2001	E2 2.5% COLA for future retirees (07/01/1996)
1/1/2000	E2 2% COLA for future retirees (07/01/1996)
1/1/1999	E2 2.3% COLA for future retirees (07/01/1996)
1/1/1997	E2 2.5% COLA for future retirees (07/01/1996)
7/1/1993	Benefit B-3 (80% max)
7/1/1992	Benefit B-2
7/1/1991	Benefit C-2/Base B-1
7/1/1991	Benefit F55 (With 25 Years of Service)
7/1/1990	Member Contribution Rate 0.00%
11/24/1970	Covered by Act 88
7/1/1968	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1968	10 Year Vesting
7/1/1968	Benefit C (Old)
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
	Fiscal Month - July

10 - Police/Disp

7/1/2018	Participant Contribution Rate 1.5%
12/1/2016	Service Credit Purchase Estimates - No
7/1/2003	Benefit B-4 (80% max)
1/1/2001	E2 2.5% COLA for future retirees (07/01/1996)
1/1/2000	E2 2% COLA for future retirees (07/01/1996)
1/1/1999	E2 2.3% COLA for future retirees (07/01/1996)
1/1/1997	E2 2.5% COLA for future retirees (07/01/1996)
1/1/1995	Benefit B-3 (80% max)
1/1/1995	Benefit F50 (With 25 Years of Service)
1/1/1989	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1989	10 Year Vesting
1/1/1989	Benefit C-2/Base B-1
1/1/1989	Benefit F55 (With 25 Years of Service)
5/1/1987	Member Contribution Rate 0.00%
11/24/1970	Covered by Act 88
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
	Fiscal Month - July

11 - Dept Heads

12/1/2016	Service Credit Purchase Estimates - No
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11 - Dept Heads

7/1/2013	Non Standard Compensation Definition
7/1/2003	Benefit B-4 (80% max)
1/1/2001	E2 2.5% COLA for future retirees (07/01/1996)
1/1/2000	E2 2% COLA for future retirees (07/01/1996)
1/1/1999	E2 2.3% COLA for future retirees (07/01/1996)
1/1/1997	E2 2.5% COLA for future retirees (07/01/1996)
7/1/1993	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1993	10 Year Vesting
7/1/1993	Benefit B-3 (80% max)
7/1/1993	Benefit F55 (With 25 Years of Service)
7/1/1993	Member Contribution Rate 0.00%
11/24/1970	Covered by Act 88
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
	Fiscal Month - July

12 - DPW/Ctrl/Nonunion aftr 7/1/13

7/1/2018	Participant Contribution Rate 1.5%
12/1/2016	Service Credit Purchase Estimates - No
11/1/2013	Benefit FAC-5 (5 Year Final Average Compensation)
11/1/2013	10 Year Vesting
11/1/2013	Non Standard Compensation Definition
11/1/2013	Day of work defined as 8 Hours a Day for All employees.
11/1/2013	Benefit C-1 (New)
11/1/2013	Benefit F55 (With 25 Years of Service)
11/1/2013	Member Contribution Rate 0.00%
11/24/1970	Covered by Act 88
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
	Fiscal Month - July

20 - Police Off & Comm. staff

7/1/2018	Participant Contribution Rate 1.5%
12/1/2016	Service Credit Purchase Estimates - No
11/1/2013	Benefit FAC-5 (5 Year Final Average Compensation)
11/1/2013	10 Year Vesting
11/1/2013	Non Standard Compensation Definition
11/1/2013	Day of work defined as 8 Hours a Day for All employees.
11/1/2013	Benefit C-1 (New)
11/1/2013	Benefit F55 (With 25 Years of Service)
11/1/2013	Member Contribution Rate 0.00%
11/24/1970	Covered by Act 88
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
	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	4.6
2. Ratio of actuarial accrued liability to payroll	10.4
3. Ratio of actives to retirees and beneficiaries	0.7
4. Ratio of market value of assets to benefit payments	6.8
5. Ratio of net cash flow to market value of assets (boy)	-4.7%

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	24
12	Indicate number of inactive members	8
13	Indicate number of retirees and beneficiaries	35
14 Investment Performance for Calendar Year Ending December 31, 2018¹		
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	\$7,306,322
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	\$16,311,029
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending June 30,2019	\$828,168

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.”