



July 7, 2021

City # 00840

City of Memphis
721 Robertson
Memphis, TX 79245-3337

Attention: Finance Director

Subject: 2021 Fiscal Year Governmental Accounting Standards Board (GASB) Employer Reporting Package for Pensions

This reporting package contains data to assist you in complying with the reporting requirements of Governmental Accounting Standards Board (GASB) Statement No. 68, *Accounting and Financial Reporting for Pensions, an amendment of GASB Statement No. 27*, for your 2021 fiscal year. As a TMRS participating city, you should comply with provisions for an agent multiple-employer defined benefit pension plan.

The TMRS website provides additional information related to GASB pension standards under the For Cities tab, Actuarial & Accounting, GASB Compliance.

If you have questions about this material or need any assistance, please email pensionaccounting@TMRS.com.

Sincerely,

A handwritten signature in black ink that reads "Rhonda H. Covarrubias". The signature is written in a cursive, flowing style.

Rhonda H. Covarrubias
Director of Finance

City of Memphis, Texas

GASB STATEMENT NO. 68 EMPLOYER REPORTING

ADMINISTERED BY TEXAS MUNICIPAL RETIREMENT SYSTEM

(AN AGENT MULTIPLE-EMPLOYER SYSTEM)

DECEMBER 31, 2020 MEASUREMENT DATE





July 7, 2021

City # 00840

Finance Director
City of Memphis
721 Robertson
Memphis, TX 79245-3337

Subject: GASB Statement No. 68 Employer Reporting Information

Dear Finance Director:

As required by the Governmental Accounting Standards Board Statement No. 68 *Accounting and Financial Reporting for Pensions* (GASB 68), your city must disclose its participation in the Texas Municipal Retirement System (TMRS). This document includes schedules and information for your city to prepare its GASB disclosures for your 2021 fiscal year, as determined by the December 31, 2020 actuarial valuation and measurement date.

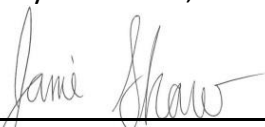
Our actuarial calculations for this report were prepared for the purpose of complying with the requirements of GASB 68. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB 68. Our calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB 68 may produce significantly different results.

This report is based upon information, furnished to us by TMRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know by contacting your TMRS representative. This information was checked for internal consistency but was not otherwise audited.

To the best of our knowledge, the information contained with this report is accurate and fairly represents the actuarial position of the City of Memphis in its participation in the Texas Municipal Retirement System. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Janie Shaw and Joe Newton are members of the American Academy of Actuaries (MAAA) and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

By 
Janie Shaw, ASA, MAAA, EA
Consultant


By 
Joseph Newton, FSA, EA, MAAA
Pension Market Leader

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Actuarial Valuation and Measurement Date, December 31,	2020	2019
Membership		
Number of		
- Inactive employees or beneficiaries currently receiving benefits	9	8
- Inactive employees entitled to but not yet receiving benefits	13	10
- Active employees	20	19
- Total	42	37
Covered Payroll	\$ 602,023	\$ 561,925
Net Pension Liability		
Total Pension Liability	\$ 3,131,012	\$ 2,988,045
Plan Fiduciary Net Position	2,931,360	2,745,377
Net Pension Liability/(Asset)	\$ 199,652	\$ 242,668
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	93.62%	91.88%
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	33.16%	43.19%
Development of the Single Discount Rate		
Single Discount Rate	6.75%	6.75%
Long-Term Expected Rate of Return	6.75%	6.75%
Long-Term Municipal Bond Rate*	2.00%	2.75%
Last year ending December 31 in the 100 year projection period for which projected benefit payments are fully funded	N/A	N/A

* The rate is based on the Fidelity 20-Year Municipal GO AA Index daily rate closest to but not later than the Measurement Date.

IMPLEMENTING AND REPORTING YOUR PENSION AMOUNTS

Report Purpose and Scope

GASB 68 establishes standards for pension accounting and financial reporting for your city as a member government (employer) of TMRS (a defined benefit, multiple-employer agent system). Under GASB 68, the employer must report the net pension liability, pension expense and related deferred inflows and outflows of resources associated with providing retirement benefits to their employees and retirees in their basic financial statements. In addition, extensive note disclosures and related Required Supplementary Information are also required. The purpose of this report is to provide the employer government with the actuarially calculated pension amounts and disclosures in a format that complies with all GASB requirements and facilitates the auditing of those numbers in accordance with the guidance for employers of defined benefit pension plans contained in the AICPA State and Local Government Audit and Accounting Guide.

Financial Reporting Overview

GASB 68 focuses primarily on the economic flow of resources, full accrual accounting that is reported in the government-wide and proprietary fund financial statements. Governmental fund reporting and budgetary basis accounting that most governments utilize throughout the year will be unaffected. This report will provide most of the information necessary for employers' financial reporting needs and for employers to perform their year-end GAAP conversion.

GASB 68 requires employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability (NPL) is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement). The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of certain changes in the liability and investment experience. Based on future investment performance, the NPL may be either higher or lower than the funding-based unfunded actuarial accrued liability and it is likely to change far more in any given year than the funding-based numbers.

The member government (city) will need to record the pension amounts for the year:

- a. Recording the Net Pension Liability and related deferred inflows and outflows of resources on the Statement of Net Position and
- b. Recording pension expense in the Statement of Changes in Net Position, by:
 - (1) Converting fiscal year contributions to TMRS' calendar year contributions
 - (2) Eliminating total contributions/pension expenditures per the general ledger
 - (3) Reflecting the change in the Net Pension Liability from the beginning of the period to the end of the period



- (4) Recording current year deferral amounts for expected vs. actual experience, current year changes in assumption(s) and investment return over/under expectation
- (5) Amortizing any existing deferred inflows and outflows of resources from the previous year.

Employers will need to convert the fiscal year contributions currently recorded in their general ledger to the calendar year contributions received by TMRS. This can be accomplished by reversing out the 2020 deferral for contributions made between January 1, 2020 and your city's 2020 fiscal year-end and then recording a deferred outflow for all contributions made between January 1, 2021 and your city's 2021 fiscal year-end. Once these adjustments are made, the fiscal year contributions shown in your records should equal or approximate the contributions shown by TMRS on line B. 1 in the Schedule of Changes in the Net Pension Liability and Related Ratios shown in the Financial Schedules section of this report.

The entry below is provided for illustrative purposes only. This example assumes that the net pension liability increased from the beginning of the year, that current year actuarial experience resulted in a gain (deferred inflow) and that investment experience compared to expectation resulted in a loss (deferred outflow). Your experience may vary.

Pension Expense	xxx	
Deferred Outflow-Contributions After 12/31/2020	xxx	
Deferred Outflow-Investment Experience	xxx	
Deferred Inflow - Amortization of previous years deferred inflows	xxx	
Contributions		yyy
Deferred Outflow-Reversing of Contributions After 12/31/2019		yyy
Deferred Inflow-Actual Experience vs. Assumption		yyy
Net Pension Liability (current year change)		yyy
Deferred Outflow - Amortization of previous years deferred outflows		yyy

Keep in mind that pension expense will be the opposite side (debit/credit) of each of these amortization entries, but the format of a combined entry is shown, resulting in the pension expense line only being shown once.

In addition, the employer is responsible for allocating the pension amounts between the governmental activities and business-type activities columns of the government-wide financial statements and between individual proprietary funds.

Notes to Financial Statements

GASB 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows of resources and inflows of resources related to pensions.

In addition, GASB 68 (paragraphs 37 – 45) requires the notes of the financial statements for the employers to include certain additional information, including such items as (not all inclusive):



- a description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs;
- the number and classes of employees covered by the benefit terms;
- for the current year, sources of changes in the net pension liability;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the single discount rate;
- certain information about mortality assumptions and the dates of experience studies;
- the date of the valuation used to determine the total pension liability;
- information about changes of assumptions or other inputs and benefit terms;
- the basis for determining contributions to the plan, including a description of the plan's funding policy, as well as member and employer contribution requirements;
- the total pension liability, fiduciary net position, net pension liability and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than used to calculate the total pension liability and net pension liability for financial reporting purposes; and
- a description of the system that administers the pension plan.

The employer can refer to TMRS' "GASB 68 Employer Reporting Guide" for more detailed information on these items and/or where the information is located.

Required Supplementary Information

The financial statements of employers should also include required supplementary information showing the 10-year fiscal history (built prospectively, as the information becomes available) of:

- changes in the net pension liability (as of the measurement date);
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered payroll (as of the measurement date); and
- comparison of actual employer contributions to the actuarially determined contributions based on the plan's funding policy as of the employer fiscal year-end date.

Timing of the Valuation

Per GASB 68, an actuarial valuation to determine the total pension liability is required to be performed at least every two years. For the employer's financial reporting purposes, the net pension liability and pension expense should be measured as of the employer's "measurement date" which may not be earlier than the employer's prior fiscal year-end date. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2020 and a measurement date of December 31, 2020; as such, no roll-forward is required.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the plan's projected fiduciary net position is not sufficient to pay benefits).

For the purpose of this valuation, the expected rate of return on pension plan investments is 6.75%; the municipal bond rate is 2.00% (based on the daily rate closest to but not later than the measurement date of the Fidelity 20-Year Municipal GO AA Index). A single discount rate of 6.75% was used to measure the total pension liability as of December 31, 2020. This single discount rate was based on the expected rate of return on pension plan investments of 6.75%. Based on the stated assumptions and the projection of cash flows, the City's fiduciary net position and future contributions were sufficient to finance the future benefit payments of the current plan members for all projection years. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of the projected benefit payments to determine the total pension liability for the City. The projection of cash flows used to determine the single discount rate for the City assumed that the funding policy adopted by the TMRS Board will remain in effect for all future years. Under this funding policy, the City will finance the unfunded actuarial accrued liability over the years remaining for the closed period existing for each base in addition to the employer portion of all future benefit accruals (i.e. the employer normal cost).

Ad Hoc Benefit Increases

Paragraph 62 of GASB 68 requires that the projected benefit payments used in the calculation of the Total Pension Liability (TPL) should include future ad hoc benefit changes if they are deemed to be substantively automatic. For purposes of determining the TPL for the city, the default method for determining whether ad hoc benefit enhancements are substantively automatic is if they have been granted in i) 1 of the last 2 years and ii) 2 of the last 5 years. The default criteria will be applied beginning with the first ad hoc adoption on or after January 1, 2015.

SECTION B

FINANCIAL SCHEDULES

SCHEDULE OF PENSION EXPENSE

1. Total Service Cost	\$	83,019
2. Interest on the Total Pension Liability		200,458
3. Changes in Current Period Benefits Including Substantively Automatic Status		0
4. Employee Contributions (Reduction of Expense)		(42,142)
5. Projected Earnings on Plan Investments (Reduction of Expense)		(185,313)
6. Administrative Expense		1,348
7. Other Changes in Fiduciary Net Position		53
8. Recognition of Current Year Outflow (Inflow) of Resources-Liabilities		(5,383)
9. Recognition of Current Year Outflow (Inflow) of Resources-Assets		(4,593)
10. Amortization of Prior Year Outflows (Inflows) of Resources-Liabilities		(378)
11. Amortization of Prior Year Outflows (Inflows) of Resources-Assets		(24,803)
12. Total Pension Expense (Income)	\$	<u>22,266</u>

SCHEDULE OF OUTFLOWS AND INFLOWS – CURRENT AND FUTURE EXPENSE

A.	Recognition Period (or amortization years)	Total (Inflow) or Outflow of Resources	2020 Recognized in current pension expense	Deferred (Inflow)/Outflow in future expense
Due to Liabilities:				
Difference in expected and actual experience [actuarial (gains) or losses]	3.88	\$ (20,886)	\$ (5,383)	\$ (15,503)
Change in assumptions [actuarial (gains) or losses]	3.88	0	0	0
			\$ (5,383)	\$ (15,503)
Due to Assets:				
Difference in projected and actual earnings on pension plan investments [actuarial (gains) or losses]	5.00	\$ (22,964)	\$ (4,593)	\$ (18,371)
			\$ (4,593)	\$ (18,371)
Total:				\$ (33,874)

B. Deferred Outflows and Deferred Inflows of Resources by Year, to be recognized in future pension expense as follows:

	Net Deferred Outflows/ (Inflows) of Resources
2021	\$ (23,672)
2022	2,843
2023	(51,846)
2024	(4,592)
2025	0
Thereafter	0
Total	\$ (77,267)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY/(ASSET) AND RELATED RATIOS - CURRENT PERIOD

A. Total pension liability

1. Service Cost	\$ 83,019
2. Interest (on the Total Pension Liability)	200,458
3. Change in benefit terms including substantively automatic status	0
4. Difference between expected and actual experience	(20,886)
5. Change in assumptions	0
6. Benefit payments, including refunds of employee contributions	(119,624)
7. Net change in total pension liability	\$ 142,967
8. Total pension liability – beginning	2,988,045
9. Total pension liability – ending	<u><u>\$ 3,131,012</u></u>

B. Plan fiduciary net position

1. Contributions – employer	\$ 56,590
2. Contributions – employee	42,142
3. Net investment income	208,276
4. Benefit payments, including refunds of employee contributions	(119,624)
5. Administrative Expense	(1,348)
6. Other	(53)
7. Net change in plan fiduciary net position*	\$ 185,983
8. Plan fiduciary net position – beginning	2,745,377
9. Plan fiduciary net position – ending	<u><u>\$ 2,931,360</u></u>

C. Net pension liability/(asset) (Item A.9 - Item B.9)

\$ 199,652

D. Plan fiduciary net position as a percentage of the total pension liability (Item B.9 / Item A.9)

93.62%

E. Covered-employee payroll

\$ 602,023

F. Net pension liability/(asset) as a percentage of covered employee payroll

33.16%

* May be off due to rounding.

Note to City:

The schedule above reflects the changes in the net pension liability for the current year. GASB 68 requires 10 fiscal years of data to be provided in this schedule. The employer/city will be required to build this schedule over the 10-year period; as such, the employer should retain the annual GASB packages to utilize in building this schedule.

SCHEDULE OF CONTRIBUTIONS

Last 10 Fiscal Years (will ultimately be displayed)

	2017	2018	2019	2020
Actuarially Determined Contribution	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx
Contributions in relation to the actuarially determined contribution	<u>\$ xxx,xxx</u>	<u>\$ xxx,xxx</u>	<u>\$ xxx,xxx</u>	<u>\$ xxx,xxx</u>
Contribution deficiency (excess)	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx
Covered payroll	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx	\$ xxx,xxx
Contributions as a percentage of covered payroll	xx.xx%	xx.xx%	xx.xx%	xx.xx%

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:

Notes

Actuarially determined contribution rates are calculated as of December 31 and become effective in January 13 months later.

Methods and Assumptions Used to Determine Contribution Rates:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	23 Years
Asset Valuation Method	10 Year smoothed market; 12% soft corridor
Inflation	2.50%
Salary Increases	3.50% to 11.50% including inflation
Investment Rate of Return	6.75%
Retirement Age	Experience-based table of rates that are specific to the City's plan of benefits. Last updated for the 2019 valuation pursuant to an experience study of the period 2014 - 2018
Mortality	Post-retirement: 2019 Municipal Retirees of Texas Mortality Tables. The rates are projected on a fully generational basis with scale UMP. Pre-retirement: PUB(10) mortality tables, with the Public Safety table used for males and the General Employee table used for females. The rates are projected on a fully generational basis with scale UMP.

Other Information:

Notes

There were no benefit changes during the year.



Note to City:

GASB 68 requires 10 fiscal years of data to be provided in the Schedule of Contributions; the City will build this report over the next 10-year period. **The data in this schedule is based on the City's fiscal year-end**, not the valuation/measurement date as provided in other schedules of this report.

The Actuarially Determined Contribution (ADC) dollar amount can be calculated by multiplying the City's Full Retirement Rate (**excludes portion of rate for Supplemental Death Benefits Fund**) by the applicable payroll amount (for payroll, cities can use "gross earnings" as noted on line 1 of their TMRS-3 "Summary of Monthly Payroll Report"). The applicable months for the City's fiscal year are summed to determine the total ADC. Actual contribution amounts (employer-portion) remitted to TMRS will equal the "contributions in relation to ADC", with the deficiency/(excess) result then calculated. Covered payroll is the sum of the "gross earnings" for the applicable months of the TMRS-3 reports.

For additional detailed information, please reference the TMRS "GASB 68 Employer Reporting Guide."

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

1% Decrease 5.75%	Current Single Discount Rate Assumption 6.75%	1% Increase 7.75%
\$ 598,503	\$ 199,652	\$ (133,244)

SECTION C

ACTUARIAL ASSUMPTIONS

SUMMARY OF ACTUARIAL ASSUMPTIONS

These actuarial assumptions were developed primarily from the actuarial investigation of the experience of TMRS over the four year period from December 31, 2014 to December 31, 2018. They were adopted in 2019 and first used in the December 31, 2019 actuarial valuation.

I. Economic Assumptions

A. General Inflation – General Inflation is assumed to be 2.50% per year.

B. Discount/Crediting Rates

1. System-wide Investment Return Assumption: 6.75% per year, compounded annually, composed of an assumed 2.50% inflation rate and a 4.25% net real rate of return. This rate represents the assumed return, net of all investment and administrative expenses. This is the discount rate used to value the liabilities of the individual employers.
2. Assumed discount/crediting rate for Supplemental Disability Benefits Fund and individual employee accounts: an annual rate of 5.00% for (1) accumulating prior service credit and updated service credit after the valuation date, (2) accumulating the employee current service balances, (3) determining the amount of the monthly benefit at future dates of retirement or disability, and (4) calculating the actuarial liability of the system-wide Supplemental Disability Benefits Fund.

C. Overall Payroll Growth – 2.75% per year, which is used to calculate the contribution rates for the retirement plan of each participating city as a level percentage of payroll. This represents the expected increase in total payroll. This increase rate is solely due to the effect of wage inflation on salaries, with no allowance for future membership growth. However, for cities with a decrease in the number of contributing members from 2008 to 2018, the payroll growth is decreased by half the annual percentage decrease in the count capped at a 1.0% decrease per year and rounded down to the nearest 0.1%.

D. Individual Salary Increases –

Salary increases are assumed to occur once a year, on January 1. Therefore, the pay used for the period year following the valuation date is equal to the reported pay for the prior year, increased by the salary increase assumption. Salaries are assumed to increase by the following graduated service-based scale.

<u>Years of Service</u>	<u>Rate (%)</u>
1	11.50%
2	7.25%
3	6.75%
4	6.25%
5	6.00%
6	5.75%
7	5.50%
8	5.25%
9	5.00%
10	4.75%
11-12	4.50%
13-15	4.25%
16-20	4.00%
21-24	3.75%
25 +	3.50%

- E. Annuity Increase – The Consumer Price Index (CPI) is assumed to be 2.50% per year prospectively. For the City of Memphis annual annuity increases of 1.86% are assumed when calculating the TPL.
- F. Load for Updated Service Credit – To reflect the asymmetric nature of the credits due to the USC provision, there is a load on the final average earnings used in the calculation of 0.1% per year into the future that the calculation is performed.

II. Demographic Assumptions

A. Termination Rates

1. For the first 10 years of service, the base table rates vary by gender, entry age, and length of service. For City of Memphis the base table is then multiplied by a factor of 100.0% based on the experience of the city in comparison to the group as a whole. A further multiplier is applied depending on an employee's classification: 1) Fire – 68%, 2) Police – 86%, or 3) Other – 108%. A sample of the base rates follows:

Males

Age	Service									
	0	1	2	3	4	5	6	7	8	9
20	0.3079	0.2766	0.2305	0.2037	0.1951	0.1764	0.1612	0.1311	0.1078	0.0860
25	0.2798	0.2393	0.1911	0.1638	0.1507	0.1336	0.1210	0.1060	0.0976	0.0798
30	0.2585	0.2163	0.1697	0.1395	0.1138	0.1052	0.0945	0.0817	0.0785	0.0655
35	0.2642	0.2183	0.1663	0.1334	0.1107	0.1048	0.0894	0.0758	0.0655	0.0598
40	0.2602	0.2172	0.1647	0.1279	0.1103	0.0994	0.0849	0.0749	0.0633	0.0608
45	0.2392	0.2040	0.1640	0.1287	0.1110	0.0976	0.0857	0.0750	0.0638	0.0607
50	0.2191	0.1825	0.1489	0.1211	0.1072	0.0935	0.0851	0.0755	0.0636	0.0609
55	0.2112	0.1759	0.1334	0.1132	0.0908	0.0911	0.0813	0.0719	0.0643	0.0591
60	0.2108	0.1626	0.1298	0.1118	0.0833	0.0915	0.0794	0.0721	0.0602	0.0579
65	0.2109	0.1542	0.1305	0.1121	0.0847	0.0914	0.0798	0.0738	0.0577	0.0581
70	0.2109	0.1557	0.1304	0.1121	0.0845	0.0914	0.0797	0.0735	0.0581	0.0581

Females

Age	Service									
	0	1	2	3	4	5	6	7	8	9
20	0.3080	0.2836	0.2258	0.2132	0.2030	0.2054	0.1561	0.1565	0.1590	0.1600
25	0.2828	0.2449	0.2101	0.1995	0.1739	0.1690	0.1392	0.1375	0.1206	0.1144
30	0.2617	0.2224	0.1981	0.1791	0.1369	0.1370	0.1297	0.1145	0.0989	0.0817
35	0.2464	0.2153	0.1834	0.1462	0.1294	0.1258	0.1130	0.1103	0.1016	0.0782
40	0.2281	0.2026	0.1641	0.1365	0.1316	0.1115	0.1040	0.0940	0.0847	0.0745
45	0.2227	0.1884	0.1450	0.1359	0.1072	0.1034	0.0909	0.0797	0.0717	0.0737
50	0.2238	0.1823	0.1369	0.1249	0.0901	0.0896	0.0837	0.0735	0.0686	0.0628
55	0.2236	0.1766	0.1372	0.1218	0.0848	0.0819	0.0725	0.0717	0.0696	0.0560
60	0.2236	0.1548	0.1372	0.1191	0.0811	0.0856	0.0656	0.0649	0.0436	0.0386
65	0.2236	0.1454	0.1372	0.1169	0.0813	0.0871	0.0678	0.0603	0.0281	0.0285
70	0.2236	0.1471	0.1372	0.1173	0.0813	0.0868	0.0675	0.0611	0.0308	0.0303

2. After 10 years of service, base termination rates vary by gender and by the number of years remaining until first retirement eligibility. For City of Memphis the base table is then multiplied by a factor of 100.0% based on the experience of the city in comparison to the group as a whole. A further multiplier is applied depending on an employee's classification: 1) Fire – 54%, 2) Police – 83%, or 3) Other – 113%. A sample of the base rates follows:

Years from Retirement	Male	Female
1	1.82%	2.34%
2	2.43%	3.15%
3	2.87%	3.75%
4	3.24%	4.25%
5	3.55%	4.67%
6	3.83%	5.06%
7	4.08%	5.40%
8	4.32%	5.72%
9	4.53%	6.02%
10	4.74%	6.30%
11	4.93%	6.57%
12	5.11%	6.82%
13	5.28%	7.06%
14	5.45%	7.28%
15	5.60%	7.50%

Termination rates end at first eligibility for retirement

- B. Forfeiture Rates (Withdrawal of Member Deposits from TMRS) for vested members vary by age and employer match, and they are expressed as a percentage of the termination rates shown in (A). The withdrawal rates for cities with a 2-to-1 match are shown below. 4% is added to the rates for 1½-to-1 cities, and 8% is added for 1-to-1 cities.

Age	Percent of Terminating Employees Choosing to Take a Refund
25	40.2%
30	40.2%
35	40.2%
40	37.0%
45	31.6%
50	26.1%
55	20.7%

Forfeiture rates end at first eligibility for retirement.

C. Service Retirees and Beneficiary Mortality Rates

For calculating the actuarial liability and the retirement contribution rates, the Gender-distinct 2019 Municipal Retirees of Texas mortality tables. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements. Based on the size of the city, rates are multiplied by an additional factor of 100.0%.

D. Disabled Annuitant Mortality Rates

For calculating the actuarial liability and the retirement contribution rates, the mortality tables for healthy retirees is used with a 4 year set-forward for males and a 3 year set-forward for females. In addition, a 3.5% and 3% minimum mortality rate will be applied to reflect the impairment for younger members who become disabled for males and females, respectively. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements subject to the floor.

E. Pre-Retirement Mortality

For calculating the actuarial liability and the retirement contribution rates, the PUB(10) mortality tables, with the Public Safety table used for males and the General Employee table used for females. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements.

F. Annuity Purchase Rates

For determining the amount of the monthly benefit at the time of retirement for both healthy and disabled annuitants, the annuity purchase rates (APRs) until 2027 are based on a mortality study performed in 2013, with the factors phasing into being based on a unisex blend of the RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment for males and females with both male and female rates multiplied by 107.5% and projected on a fully generational basis with scale BB. The current table of APRs is explicitly valued through 2032 and then it is assumed the APRs and the valuation mortality assumptions will be consistent over time. For members, a unisex blend of 70% of the males table and 30% of the female table is used, while 30% of the male table and 70% of the female table is used for beneficiaries.

G. Disability Rates

Age	Males & Females
20	0.000003
25	0.000019
30	0.000074
35	0.000194
40	0.000371
45	0.000603
50	0.000891
55	0.001235
60	0.001635
65	0.002090

H. Service Retirement Rates, applied to both Active and Inactive Members

The base table rates vary by age. For members under the age of 62, these rates are then multiplied by 2 factors based on 1) employee contribution rate and employer match and 2) if the city has a recurring COLA.

Age	
<50	0.05
50-51	0.07
52-54	0.08
55-59	0.13
60	0.16
61	0.17
62	0.25
63-64	0.20
65-74	0.30
75 and over	1.00

Note: For cities without a 20-year/any age retirement provision, the rates are loaded by 50% for ages 60 & below with 25 or more years of service.

Plan Design Factors Applied to Base Retirement Rates

Employer Match	Employee Contribution Rate		
	5%	6%	7%
1 – 1	0.75	0.80	0.84
1.5 – 1	0.81	0.86	0.92
2 – 1	0.86	0.93	1.00

Recurring COLA: 100%

No Recurring COLA: 95%

III. *Methods and Assumptions*

- A. Valuation of Assets – The actuarial value of assets is based on the market value of assets with a ten-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. The actuarial value of assets is further adjusted by 33% of any difference between the initial value and a 12% corridor around the market value of assets, if necessary.
- B. Actuarial Cost Method: The actuarial cost method being used is known as the Entry Age Normal Actuarial Cost Method. The Entry Age Normal Actuarial Cost Method develops the annual cost of the Plan in two parts: that attributable to benefits accruing in the current year, known as the normal cost, and that due to service earned prior to the current year, known as the amortization of the unfunded actuarial accrued liability. The normal cost and the actuarial accrued liability are calculated individually for each member. The normal cost rate for an employee is the contribution rate which, if applied to a member's compensation throughout their period of anticipated covered service with the city, would be sufficient to meet all benefits payable on their behalf. The normal cost is calculated using an entry age based on benefit service with the current city. If a member has additional time-only vesting service through service with other TMRS cities or other public agencies, they retain this for determination of benefit eligibility and decrement rates. The salary-weighted average of these rates is the total normal cost rate. The unfunded actuarial accrued liability reflects the difference between the portion of projected benefits attributable to service credited prior to the valuation date and assets already accumulated. The unfunded actuarial accrued liability is paid off in accordance with a specified amortization procedure outlined in C below.
- C. Amortization Policy: For “underfunded” cities the amortization as of the valuation date is a level percentage of payroll over a closed period using the process of “laddering”. Bases that existed prior to this valuation continue to be amortized on their original schedule. For cities with twenty or more employees new experience losses are amortized over individual periods of not more than 25 years. Beginning December 31, 2020, new loss bases for cities with fifteen or more employees will be amortized over individual periods of not more than 20 years. New gains (including lump sum contributions) are offset against and amortized over the same period as the current largest outstanding loss base for the specific City which in turn decreases contribution rate volatility.

Once a City reaches an “overfunded” status, all prior bases are erased and an amount of the surplus is credited against the contribution rate to keep the funded ratio constant year over year.

Ad hoc benefit enhancements are amortized over individual periods using a level dollar policy. The period will be based on the minimum of 12 years or the current life expectancy of the covered group. However, if the non-ad hoc (level percent) amortization factor is smaller due to a shorter amortization period based on the employer's size, as described below, ad hoc enhancements will be amortized the same as any other loss.

- D. Small City Methodology – For cities with fewer than twenty employees, more conservative methods and assumptions are used. First, lower termination rates are used for smaller cities, with maximum multipliers of 75% for employers with less than 6 members, 85% for employers with 6 to 10 members, 100% for employers with 11 to 15 members, and 110% for employers with less than 100 members.

There is also a load on the life expectancy for employers with less than 15 active members. The life expectancy will be loaded by decreasing the mortality rates by 1% for every active member less than 15. For example, an employer with 5 active members will have the baseline mortality tables multiplied by 90% (10 active members times 1%).

For underfunded plans, the maximum period for amortizing losses is decreased by 1 year for each active member less than the 20 member threshold. For example, an employer with 8 active members and a current maximum amortization period of 25 will use $(25 - (20 - 8)) = 13$ year amortization period for the gain or loss in that year's valuation. Under this policy, the lowest amortization period will be $25 - (20 - 1) = 6$ years. Once the plan is overfunded, the amortization period will revert back to the standard policy. Beginning December 31, 2020, the member threshold will be lowered to 15 to be consistent with the decrease in the standard amortization period to 20.

IV. Other Assumptions

1. Valuation payroll (used for determining the amortization contribution rate): A weighted average of the actual payroll during the prior fiscal years, with 33% weight given to the most recent year and 67% weight given to the expected payroll for the previous fiscal year, moved forward with one year's payroll growth rate and adjusted for changes in population.
2. Individual salaries used to project benefits: For members with more than three years of service, actual salaries from the past three fiscal years are used to determine the USC final average salary as of the valuation date. For future salaries, this three-year average is projected forward with two years of salary scale to create the salary for the year following the valuation. This value is then projected with normal salary scales.
3. Timing of benefit payments: Benefit payments are assumed to be made in the middle of the month. Although TMRS benefits are paid at the end of the month, eligibility for that payment is determined at the beginning of the month. A middle of month

payment approximates the impact of the combination of eligibility determination and actual payment timing.

4. Percent married: 100% of the employees are assumed to be married.
5. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
6. Optional Forms: All healthy and disabled members are assumed to choose a 50% Joint and Survivor option when they retire. For healthy members, this is approximated by reducing the benefit payment by a factor equal to 2.1% at age 60 (with adjustments by age). The 2.1% is effective for the 2019 calendar year and will reduce by 10% each year until the phase into the APR rates is complete, at which time there will be no need for such factor.
7. Percent electing annuity on death (when eligible): For vested members not eligible for retirement, 75% of the spouses of male members and 70% of the spouses of female members are assumed to commence an immediate benefit in lieu of a deferred annuity or a refund. Those not electing an immediate benefit are assumed to take a refund. All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity that commences immediately.
8. Partial Lump Sum Utilization: It is assumed that each member at retirement will withdraw 40% of their eligible account balance.
9. Inactive Population: All non-vested members of a city are assumed to take an immediate refund if they are not contributing members in another city. Vested members not contributing in another city are assumed to take a deferred retirement benefit, except for those who have terminated in the past 12 months for whom one year of forfeiture probability is assumed. The forfeiture rates for inactive members of a city who are contributing members in another city are equal to the probability of termination multiplied by the forfeiture rates shown in II(A) and II(B) respectively. These rates are applied each year until retirement eligibility. Once a member is retirement eligible, they are assumed to commence benefits based on the service retirement rates shown in II(H).
10. There will be no recoveries once disabled.
11. No surviving spouse will remarry and there will be no children's benefit.
12. Decrement timing: Decrements of all types are assumed to occur mid-year.
13. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

14. Decrement relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
15. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
16. Benefit Service: All members are assumed to accrue 1 year of eligibility service each year.
17. The decrement rates for service related decrements are based on total TMRS eligibility service.

V. *Participant Data*

Participant data was supplied in electronic text files. There were separate files for (i) active and inactive members, and (ii) members and beneficiaries receiving benefits.

The data for active members included birthdate, gender, service with the current city and total vesting service, salary, employee contribution account balances, as well as the data used in the next calculation of the Updated Service Credit (USC). For retired members and beneficiaries, the data included date of birth, gender, spouse's date of birth (where applicable), amount of monthly benefit, date of retirement, form of payment code, and aggregate increase in the CPI that will be used in the next calculation of the cost of living adjustment.

To the extent possible we have made use of all available data fields in the calculation of the liabilities stated in this report. Actual CPI is used to model the wear-away effect or “catch-up” when a city changes its COLA provisions. Adjustments are made for members who have service both in a city with “20 and out” retirement eligibility and one that hasn’t adopted it to calculate the earliest possible retirement date.

Salary supplied for the current year was based on the annualized earnings for the year preceding the valuation date.

Assumptions were made to correct for missing, bad, or inconsistent data. These had no material impact on the results presented.

SECTION D

DEFERRED INFLOWS/OUTFLOWS OF RESOURCES – AMORTIZATION SCHEDULES FOR FUTURE PENSION EXPENSES

Amortization Schedule

Deferred (Inflows)/Outflows of Resources

	Remaining Recognition period (or amortization years)	Total Remaining (Inflow) or Outflow of Resources	Measurement Year							
			2020	2021	2022	2023	2024	2025	Thereafter	
Due to Liabilities:										
difference in experiences (inflows) /outflows										
2020	3.8800	\$ (20,886)	\$ (5,383)	\$ (5,383)	\$ (5,383)	\$ (4,737)	\$ 0	\$ 0	\$ 0	
2019	2.4300	24,449	10,062	10,062	4,325	0	0	0	0	
2018	1.9800	(3,876)	(1,957)	(1,919)	0	0	0	0	0	
2017	1.0000	(5,467)	(5,467)	0	0	0	0	0	0	
2016	1.0000	(5,956)	(5,956)	0	0	0	0	0	0	
Total			\$ (8,701)	\$ 2,760	\$ (1,058)	\$ (4,737)	\$ 0	\$ 0	\$ 0	
change in assumptions (inflows) /outflows										
2019	2.4300	\$ 7,145	\$ 2,940	\$ 2,940	\$ 1,265	\$ 0	\$ 0	\$ 0	\$ 0	
Total			\$ 2,940	\$ 2,940	\$ 1,265	\$ 0	\$ 0	\$ 0	\$ 0	
Due to Assets:										
excess investment returns (inflows) /outflows										
2020	5.0000	\$ (22,964)	\$ (4,593)	\$ (4,593)	\$ (4,593)	\$ (4,593)	\$ (4,592)	\$ 0	\$ 0	
2019	4.0000	(170,061)	(42,515)	(42,515)	(42,515)	(42,516)	0	0	0	
2018	3.0000	149,236	49,746	49,746	49,744	0	0	0	0	
2017	2.0000	(64,019)	(32,009)	(32,010)	0	0	0	0	0	
2016	1.0000	(25)	(25)	0	0	0	0	0	0	
Total			\$ (29,396)	\$ (29,372)	\$ 2,636	\$ (47,109)	\$ (4,592)	\$ 0	\$ 0	

SECTION E

GLOSSARY OF TERMS

GLOSSARY OF TERMS

<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value (APV)</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.
<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Agent Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan in which the assets of the participating government employers are pooled for investment purposes but separate accounts are maintained for each individual employer. As a result, each participating employer's share of the pooled assets is legally available to pay the defined benefit pensions of only its retirees.

GLOSSARY OF TERMS

<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Covered Payroll</i>	The annual payroll of covered employees, which is typically only the pensionable pay.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Discount Rate</i>	<p>For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:</p> <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period and;2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
<i>Entry Age Actuarial Cost Method (EAN)</i>	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

<i>Fiduciary Net Position (FNP)</i>	The fiduciary net position is the market value of the assets of the trust.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<i>Long-Term Expected Rate of Return</i>	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
<i>Municipal Bond Rate</i>	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
<i>Net Pension Liability (NPL)</i>	The NPL is the liability of employers and non-employer contribution entities to plan members for benefits provided through a defined benefit pension plan. The NPL is calculated as the Total Pension Liability (TPL) less the Fiduciary Net Position (FNP). Should the FNP exceed the TPL, the city will instead have a Net Pension Asset (NPA).
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	<p>The total pension expense is the sum of the following items:</p> <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (reduction of expense)5. Projected Earnings on Plan Investments (reduction of expense)6. Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets