Gabriel Roeder Smith & Company
Consultants & Actuaries

# CITY OF OWOSSO
# EMPLOYEES RETIREMENT SYSTEM
## SEVENTY-SECOND ANNUAL ACTUARIAL VALUATION
## DECEMBER 31, 2016

# CONTENTS

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
One Towne Square
Suite 800
Southfield, MI 48076-3723
248.799.9000 phone
248.799.9020 fax
www.gabrielroeder.com

April 21, 2017

Board of Trustees
City of Owosso Employees Retirement System
Owosso, Michigan

**Re: City of Owosso Employees Retirement System Actuarial Valuation as of December 31, 2016**

Dear Board Members:

The results of the December 31, 2016 Annual Actuarial Valuation of the City of Owosso Employees Retirement System are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress and to determine the employer contribution rate for the fiscal year beginning July 1, 2017 in accordance with Board policy. A separate report will be issued that contains information needed for reporting under GASB Statements No. 67 and No. 68.

This report should not be relied on for any purpose other than the purposes described. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

The valuation was based upon information furnished by the City, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal 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 the City.

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; 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. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

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 the City of Owosso Employees Retirement System 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.

Mark Buis and Laura Frankowiak are Members of the American Academy of Actuaries and meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company believes that the actuarial assumptions used in this valuation are reasonable. Furthermore, we believe the funding policy is reasonable and is expected to fund the System benefits expected to be paid to members (based on the current assumptions). However, reasonable assumptions and funding policies do not guarantee benefit security. We recommend the Board consider benefit security whenever adopting contributions. We remind the Board that they are free to adopt larger contributions if they believe such larger contributions are warranted.

Respectfully submitted,

Kenneth G. Alberts | Mark Buis, FSA, FCA, EA, MAAA | Laura Frankowiak, ASA, MAAA

KGA/MB/LF:mrb

# SECTION A

## VALUATION RESULTS

# Computed Contributions Expressed as Percents of Annual Pay for the Fiscal Year Beginning July 1, 2017 Using Entry Age Funding Method

| Contributions for | | General | Police | Fire Dept. | Total |
|---|---|---|---|---|---|
| **Number of Active Members** | | 23 | 11 | 18 | 52 |
| Actuarial Accrued Liabilities | | $22,368,662 | $5,823,140 | $9,887,278 | $38,079,080 |
| Assets | | 18,968,891 | 5,469,122 | 9,117,539 | 33,555,552 |
| Unfunded Actuarial Accrued Liabilities | | 3,399,771 | 354,018 | 769,739 | 4,523,528 |
| Total Normal Cost - % | | 13.84% | 16.52% | 17.29% | |
| Members' Contributions - % | | 6.00 | 10.00 | 8.00 | |
| City's Normal Cost - % | | 7.84 | 6.52 | 9.29 | |
| Unfunded Actuarial Accrued Liabilities - % | | 36.43 | 5.23 | 6.90 | |
| UAL Payment | | $ 389,051 | $ 35,929 | $ 75,779 | $ 500,759 |
| City's Normal Cost - $ | | 83,725 | 44,774 | 101,970 | 230,469 |
| **TOTAL CITY CONTRIBUTIONS** | | | | | |
| **Effective 7/1/2017** | **- %** | **44.27%** | **11.75%** | **16.19%** | |
| **Effective 7/1/2017 (Mid of FY contribution)** | **- $** | **$ 472,776** | **$ 80,703** | **$ 177,749** | **$ 731,228** |
| **Effective 7/1/2017 (End of FY contribution)** | **- $** | **$ 489,870** | **$ 83,659** | **$ 184,183** | **$ 757,712** |
| Amortization Period (in years) | | 12 | 12 | 12 | |
| For every $1,000 of Contingency Reserve Released, the Employer Contribution Decreases*: | | $ 0 | $ 102 | $ 152 | $ 254 |

* *The change in contingency reserve is dependent on the timing of the City's contributions.*

Contributions shown above are based on the Board's current funding policy. The Board should regularly review/re-evaluate the funding policy. The Board is free to adopt higher employer contributions if it feels higher contributions are warranted.

# Timing of Contribution Payments

The contribution requirements in this report anticipate regular payments throughout the year. Examples would be at each payroll date or in 12 monthly installments. If the employer contribution pattern is significantly different, an adjustment to the costs may be appropriate. For example, a lump sum contribution at the beginning of the year is available for investment throughout the year and, therefore, ought to be somewhat smaller than 12 monthly payments. Similarly, a lump sum contribution at the end of the year will not generate any investment income that year and so must be greater than 12 monthly payments. Examples of this are shown below using an interest rate equal to the valuation rate of investment return to adjust for timing differences:

| | Each Payment | Total for Year |
|---|---|---|
| Lump Sum at Beginning of Fiscal Year (7/1/2017): | $705,720 | $705,720 |
| Lump Sum at End of Fiscal Year (6/30/2018): | 757,712 | 757,712 |
| Lump Sum at Middle of Fiscal Year (12/31/2017): | 731,228 | 731,228 |
| Twelve Monthly Installments (starting July 2017): | 60,936 | 731,228 |

Illustration is based on the calculated mid-year contributions adjusted to the beginning of year or end of year based on simple interest, by division.

# Valuation Assets and Actuarial Accrued Liability

***In financing the actuarial accrued liabilities***, the valuation assets of $33,555,552 were distributed as shown below.

| | Present Valuation Assets Applied to | | | |
|---|---|---|---|---|
| **Reserves for** | **Member Actuarial Accrued Liabilities** | **Retired Life Actuarial Liabilities** | **Contingency Reserve** | **Totals** |
| Employees' Contributions | $ 3,121,008 | | | $ 3,121,008 |
| Employer Contributions | 707,907 | $ 1,033,089 | | 1,740,996 |
| Retired Benefit Payments | | 26,576,604 | $838,929 | 27,415,533 |
| Undistributed Investment Income | 1,278,015 | | | 1,278,015 |
| Totals | $ 5,106,930 | $27,609,693 | $838,929 | $33,555,552 |

# Historical Comparison of Contingency Reserve by Division

| Valuation Year | Contingency Reserve General | Police | Fire | Total |
|---|---|---|---|---|
| 2003* | $ 332,125 | $ 174,762 | $ 660,099 | $ 1,166,986 |
| 2004* | 149,603 | 234,935 | 329,028 | 713,566 |
| 2005 | 379,612 | 242,833 | 630,448 | 1,252,893 |
| 2006 | 374,388 | 209,771 | 629,568 | 1,213,727 |
| 2007 | 403,449 | 344,481 | 616,305 | 1,364,235 |
| 2008 | 366,855 | 351,453 | 707,770 | 1,426,078 |
| 2009 | 297,674 | 468,166 | 697,978 | 1,463,818 |
| 2010 | 505,101 | 480,114 | 689,335 | 1,674,550 |
| 2011 | 566,173 | 524,232 | 650,227 | 1,740,632 |
| 2011# | 424,630 | 393,174 | 487,670 | 1,305,474 |
| 2012#@ | 366,148 | 481,920 | 425,067 | 1,273,135 |
| 2013^ | 379,078 | 669,336 | 381,914 | 1,430,328 |
| 2013^! | 118,258 | 575,524 | 178,077 | 871,859 |
| 2014 | - | 583,098 | 271,295 | 854,393 |
| 2015 | - | 602,246 | 211,785 | 814,031 |
| 2016 | - | 616,498 | 222,431 | 838,929 |

* *Prior to 2005, General Union and General Non-Union were summarized as General for purposes of the actuarial valuation. Prior to 2005, Police Command and Police Patrol were summarized as Police for purposes of the actuarial valuation. For the purpose of this exhibit, the combined General and Police groups pre-2005 have been summarized with General Union and Police Patrol respectively.*

\# *After the release of ¼ of the contingency reserve as approved by the Board as of 12/31/2011.*

@ *After transfer of $74,000 from WWTP to Sewage.*

^ *Beginning in 2013, the WWTP, Sewage, General Union, General Non-Union, and Water groups are combined into one General Group. The Police Command and Police Patrol were also combined into one Police group for purposes of the actuarial valuation.*

! *After actuarial assumptions and/or methods revised.*

# Development of Unfunded Accrued Liability Using Entry Age Funding Method

| | General | Police | Fire | Total |
|---|---|---|---|---|
| A. Accrued Liability | | | | |
| 1. For retirees and beneficiaries | | | | |
| a. Retiree Liability | $ 16,641,718 | $ 4,022,749 | $ 6,945,226 | $ 27,609,693 |
| b. Contingency Reserve | 0 | 616,498 | 222,431 | 838,929 |
| 2. For vested terminated members | 969,980 | 0 | 0 | 969,980 |
| 3. For pending MERS transfer | 0 | 0 | 0 | 0 |
| 4. For present active members | | | | |
| a. Value of expected benefit payments | 5,761,718 | 2,375,495 | 4,405,469 | 12,542,682 |
| b. Value of future normal costs | 1,004,754 | 1,191,602 | 1,685,848 | 3,882,204 |
| c. Active member liability: (a) - (b) | 4,756,964 | 1,183,893 | 2,719,621 | 8,660,478 |
| 5. Total | 22,368,662 | 5,823,140 | 9,887,278 | 38,079,080 |
| B. Present Assets (valuation basis) | 18,968,891 | 5,469,122 | 9,117,539 | 33,555,552 |
| C. Unfunded Accrued Liability (Excess Assets) as of 12/31/2016: (A.5) - (B) | 3,399,771 | 354,018 | 769,739 | 4,523,528 |
| D. Employer Normal Cost (for period 1/1/17 to 6/30/17) | 42,736 | 18,673 | 52,935 | 114,344 |
| E. Expected Employer Contribution Payable 6/30/2017 | 407,145 | 66,732 | 140,570 | 614,447 |
| F. Interest Adjustment to 6/30/2017 | 123,242 | 12,833 | 27,903 | 163,978 |
| G. Projected Unfunded Accrued Liability (Excess Assets) as of 6/30/2017: (C) + (D) - (E) + (F) | 3,158,604 | 318,792 | 710,007 | 4,187,403 |

# Employer Contribution History

| Valuation Date December 31 | City's Computed Contributions for General Members | Policemen^ and Firemen |
|---|---|---|
| 2004#(a) | 0.00 | 0.00 |
| 2005#(a)(b) | 2.67 | 1.30 |
| 2006(a)(b) | 4.28 | 1.54 |
| 2007(b) | 2.53 | 3.88 |
| 2008(b) | 10.19 | 4.77 |
| 2009#(b) | 10.90 | 5.48 |
| 2010(b) | 18.43 | 9.21 |
| 2011(a)(b) | 25.99 | 15.83 |
| 2012# | 28.60 | 11.09 |
| 2013(a) | 29.27 | 9.63 |
| 2014 | 33.57 | 10.74 |
| 2015# | 31.28 | 11.95 |
| 2016 | 44.27 | 14.48 |

*# After benefit provisions changed.*
*(a) After actuarial assumptions and/or methods revised.*
*(b) Closed groups financed using the Aggregate method.*
*^ The City's Contribution for Police Patrol has a maximum of 4% until the 2015 valuation. However, the contribution percentage on this page includes the additional contribution for the Police Command group, since the Policemen group includes both divisions.*

# Development of Experience Gain (Loss)
# Year Ended December 31, 2016

Actual experience will never (except by coincidence) exactly match assumed experience. It is hoped that *gains* and *losses* will cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the development of the experience gain (loss)is shown below.

| | | General | Police | Fire | Total |
|---|---|---|---|---|---|
| **(1)** | UAAL* at start of year | $2,875,227 | $310,424 | $403,737 | $3,589,388 |
| **(2)** | NC from last val: (Total) | 143,915 | 105,821 | 182,265 | 432,001 |
| **(3)** | Actual contributions: (Total) | 538,108 | 114,864 | 210,366 | 863,338 |
| **(4)** | Interest Accrual: [ (1) + 1/2 [(2) - (3) ] ] x 0.0725 | 194,164 | 22,178 | 28,252 | 244,594 |
| **(5)** | Expected UAAL before changes: (1) + (2) - (3) + (4) | 2,675,198 | 323,559 | 403,888 | 3,402,645 |
| **(6)** | Change from benefit improvements | 0 | 0 | 0 | 0 |
| **(7)** | Change from revised actuarial methods | 0 | 0 | 0 | 0 |
| **(8)** | Change from revised actuarial assum. | 0 | 0 | 0 | 0 |
| **(9)** | Expected UAAL after changes: (5) + (6) + (7) + (8) | $2,675,198 | $323,559 | $403,888 | $3,402,645 |
| **(10)** | Actual UAAL at end of year | 3,399,771 | 354,018 | 769,739 | 4,523,528 |
| **(11)** | Gain (Loss): (9) - (10) | (724,573) | (30,459) | (365,851) | (1,120,883) |
| **(11a)** | AAL at start of year | 21,585,513 | 5,805,304 | 9,494,717 | 36,885,534 |
| **(12)** | Gain (Loss) as percent of AAL# at start of year | (3.36%) | (0.52%) | (3.85%) | (3.04%) |

** Unfunded Actuarial Accrued Liability*

*# Actuarial Accrued Liabilities*

# Historical Comparative Schedules

## SCHEDULE OF FUNDING PROGRESS

| Actuarial Valuation Date | Actuarial Value of Assets (a) | Entry Age Actuarial Accrued Liability (AAL) (b) | Unfunded AAL (b)-(a) | Funded Ratio (a)/(b) | Covered Payroll (c) | UAAL as a % of Covered Payroll ((b-a)/c) |
|---|---|---|---|---|---|---|
| 2008 | $32,567,350 | $29,857,841 | $(2,709,509) | 109.1 % | $4,042,417 | - |
| 2009# | 32,187,590 | 30,042,649 | (2,144,941) | 107.1 | 3,952,336 | - |
| 2010 | 31,529,473 | 31,251,375 | (278,098) | 100.9 | 3,672,267 | - |
| 2011* | 29,624,891 | 33,523,677 | 3,898,786 | 88.4 | 3,746,852 | 104% |
| 2012# | 30,611,263 | 34,120,683 | 3,509,420 | 89.7 | 3,333,049 | 105% |
| 2013* | 31,913,449 | 35,821,262 | 3,907,813 | 89.1 | 3,108,992 | 126% |
| 2014 | 32,558,582 | 36,714,271 | 4,155,689 | 88.7 | 2,938,821 | 141% |
| 2015# | 33,296,146 | 36,885,534 | 3,589,388 | 90.3 | 2,891,530 | 124% |
| 2016 | 33,555,552 | 38,079,080 | 4,523,528 | 88.1 | 2,786,412 | 162% |

* *Revised actuarial assumptions and/or methods.*

\# *After benefit provisions changed.*

## SCHEDULE OF EMPLOYER CONTRIBUTIONS

| Fiscal Year Ending June 30 | Valuation Year Ended December 31 | Contribution Rates as Percents of Valuation Payroll | Computed Dollar Contribution Based on Projected Valuation Payroll* | Actual Contribution | Percentage Contributed |
|---|---|---|---|---|---|
| 2009 | 2007 | 3.02 % | $ 128,117 | $ 128,117 | 100% |
| 2010 | 2008 | 7.90 | 328,824 | 328,824 | 100 |
| 2011 | 2009 | 8.50 | 350,599 | 350,599 | 100 |
| 2012 | 2010 | 14.31 | 550,684 | 550,684 | 100 |
| 2013 | 2011 | 21.29 | 829,038 | 829,038 | 100 |
| 2014 | 2012 | 20.24 | 701,388 | 701,388 | 100 |
| 2015 | 2013 | 19.06 | 600,769 | 600,769 | 100 |
| 2016 | 2014 | 21.28 | 629,143 | 629,143 | 100 |
| 2017 | 2015 | 20.23 | 614,448 | | |
| 2018 | 2016 | 25.64 | 757,712 | | |

* *End of year dollar amount is shown beginning fiscal year ending June 30, 2017.*

The funded status shown above is not a measure of the plan's settlement costs. A funded status of 100% or above is not an indication of the need for future contributions. A funded status below 100% is an indication that future contributions are needed.

# Actuarial Balance Sheet as of December 31, 2016

| | |
|---|---|
| A. Accrued value of System assets: | |
| 1. Net assets from System financial statements | $31,715,358 |
| 2. Funding value adjustment | 1,840,194 |
| 3. Valuation assets | 33,555,552 |
| B. Present value of expected future employer contributions: | |
| 1. For normal costs | 1,899,558 |
| 2. For unfunded actuarial accrued liabilities | 4,523,528 |
| 3. Total | 6,423,086 |
| C. Present value of expected future member contributions | 1,982,646 |
| D. **Total Present and Expected Future Resources** | **$41,961,284** |

| | |
|---|---|
| A. To retirees and beneficiaries | $28,448,622 |
| B. To vested terminated members | 969,980 |
| C. To present active members: | |
| 1. Allocated to service rendered prior to valuation date | 8,660,478 |
| 2. Allocated to service likely to be rendered after valuation date | 3,882,204 |
| 3. Total | 12,542,682 |
| D. **Total Actuarial Present Value of Expected Future Benefit Payments** | **$41,961,284** |

# Comments

**Comment A:** The System was closed to General Union and Police Command Officers new entrants effective January 1, 2005 and General Non-Union new entrants effective January 1, 2006. The plan is open for Police Patrol and Fire groups.

**Comment B:** Experience during the year was less favorable than assumed. The primary sources of unfavorable experience were:

- Losses related to investment activity (the recognized rate of investment return was 6.51% compared with the assumed rate of investment return of 7.25%);
- Losses related to retiree mortality (1 death compared with 3.1 expected);
- Losses related to pay increases for Fire and Police divisions.
- Losses related to retirements (5 members actually retired compared with 1.6 expected).

As a result the funded status decreased to 88.1% on an actuarial value of assets basis and 83.3% on a market value of assets basis.

**Comment C:** The Retirement System currently has a contingency reserve of approximately $839 thousand. This reserve is the excess of the Reserve for Retired Benefit Payments over the accrued liabilities for retirees and beneficiaries.

See page A-4 for additional details regarding the contingency reserve amounts by group.

**Comment D:** While there were no System changes since the last valuation, there were changes in the member contribution rate that had previously been adopted, but are becoming effective 7/1/2017. In particular, the member contribution rate for Police decreases by 1% to 10% and the member contribution rate for Fire increases by ½% to 8%. The net effect is an increase in the City's contribution of approximately $1,400 for FY 2018. This completes the phase in of previously adopted changes.

**Comment E:** The computed Employer contribution effective July 1, 2017 is $731,228, assuming periodic payments throughout the fiscal year or a lump sum payment in the middle of the fiscal year.

# Comments

**Comment F:** The actuarial value of assets recognized a 6.51% rate of return, despite the market rate of return of 5.21%. This difference is due to the 4-year smoothing. The portion of this year's loss recognized in the actuarial value of assets was offset by the gains from prior years continuing to be recognized this year. As recognition of those prior gains are completed, there will be upward pressure on contributions as the remainder of this year's loss is recognized over the next 3 years.

**Comment G:** Forward look:

There are currently just below $1 million of past investment losses scheduled to be recognized in next year's valuation. Unless offset by gains, this will likely result in an increase in next year's employer contribution of approximately $120,000.

**Comment H:** Observations for next experience review:

- All assumptions continue to be reasonable.
- The industry trend on the mortality assumption is to move away from static projections of mortality improvements to generational projections of mortality improvement.

**Comment I:** The contingency reserve grew this year. However, since there was a mortality loss with no offsetting gains (related to retiree liabilities), the contingency reserve was expected to decrease. The contingency reserve is directly related to the development of the Reserve for Retired Benefit Payments (RRBP). We therefore attempted to reconcile the RRBP from December 31, 2015 to December 31, 2016. The chart on the following page shows our attempted reconciliation, assuming mid-year benefit payments and mid-year reserve transfers. A comparison of the expected 2016 balance to reported 2016 balance indicates the reported balance to be approximately $300K higher than expected. While we did not expect to exactly reproduce the 2016 balances due to the simplifying mid-year assumption, we expected to come closer. Analysis using the prior investment return assumption of 7.5%, which more closely reproduces the balances for these groups that do not have new retirees. We therefore recommend that the development of the RRBP be reviewed.

# Comments

Using 7.25% Interest

| Division | Reported 2015 Reserve | Reported Benefit payments | Reserve Transfers | Expected Interest (at 7.25%) | Expected 2016 Balance | Reported 2016 Reserve |
|---|---|---|---|---|---|---|
| Police Patrol | $ 4,141,497 | $ 347,998 | | $ 287,644 | $ 4,081,143 | $ 4,093,735 |
| Police Command | 504,953 | 42,339 | | 35,074.30 | 497,688.30 | 499,212 |
| Fire | 6,756,582 | 747,123 | $ 507,051 | 481,149.59 | 6,997,659.59 | 7,167,657 |
| Other | 14,234,347 | 1,467,116 | 1,695,791 | 1,040,279.63 | 15,503,301.63 | 15,654,929 |
| Total | **$ 25,637,379** | **$ 2,604,576** | **$ 2,202,842** | **$ 1,844,147** | **$ 27,079,792** | **$ 27,415,533** |

Using 7.50% Interest

| Division | Reported 2015 Reserve | Reported Benefit payments | Reserve Transfers | Expected Interest (at 7.50%) | Expected 2016 Balance | Reported 2016 Reserve |
|---|---|---|---|---|---|---|
| Police Patrol | $ 4,141,497 | $ 347,998 | | $ 297,562 | $ 4,091,061 | $ 4,093,735 |
| Police Command | 504,953 | 42,339 | | 36,283.76 | 498,897.76 | 499,212 |
| Fire | 6,756,582 | 747,123 | $ 507,051 | 497,740.95 | 7,014,250.95 | 7,167,657 |
| Other | 14,234,347 | 1,467,116 | 1,695,791 | 1,076,151.34 | 15,539,173.34 | 15,654,929 |
| Total | **$ 25,637,379** | **$ 2,604,576** | **$ 2,202,842** | **$ 1,907,738** | **$ 27,143,383** | **$ 27,415,533** |

**ACTUARIAL DISCLOSURE:** The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section D of this report. This report includes certain risk metrics on page A-8, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

# Comments (Concluded)

**OTHER OBSERVATIONS:**

**General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status**

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.25% on the actuarial value of assets), it is expected that:

1) employer normal cost amounts as a percentage of payroll will remain approximately level year-to-year;
2) the unfunded actuarial accrued liability will be fully amortized after 12 years; and
3) the funded status of the plan will increase gradually towards a 100% funded ratio.

**Limitations of Funded Status Measurements**

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regards to any funded status measurements presented in this report:

1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
2) The measurement is inappropriate for assessing the need for or the amount of future employer contributions.
3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

# SECTION B

## VALUATION DATA

# Brief Summary of Benefit Provisions
# (December 31, 2016)

## Regular Retirement (no reduction factor for age)

***Eligibility*** - General* Non-Union: Age 60 with 10 or more years of service.
General* Union: Age 55 with 25 or more years of service or age 60 with 10 or more years of service.
Police: Age 50 with 25 or more years of service or age 55 with 10 or more years of service.
Fire: Any age with 25 or more years of service or age 55 with 10 or more years of service if hired prior to 6/30/93. Age 50 with 25 or more years of service or age 55 with 10 or more years of service if hired after 6/30/93.

***Annual Amount*** - General* Non-Union: Final Average Compensation (FAC) times 2.5% for all years of service to a maximum 80% of FAC, effective 7/1/2010.
Fire: FAC times the sum of a) 2.80% for the first 25 years of service plus b) 1.0% for years of service in excess of 25 years to a maximum of 80% FAC.
Police: FAC times 2.80% for all years of service to a maximum 80% of FAC.
General* Union – FAC times 2.50% for all years of service to a maximum of 80% FAC.

***Type of Final Average Compensation*** - Highest 3 consecutive years out of last 10. Some lump sums included.

** Includes WWTP, Water, and Sewage.*

## Deferred Retirement (vested benefit)

***Eligibility*** - 10 or more years of service. Benefit begins at age 60.

***Annual Amount*** - Computed as a regular retirement but based upon service and final average compensation at time of termination.

## Duty Disability Retirement

***Eligibility*** - No age or service requirements. Must be in receipt of worker's compensation.

***Annual Amount*** - Computed as a regular retirement. Minimum benefit to age 65 is 20% of final average compensation. Upon termination of worker's compensation, additional service credit is granted and benefit is recomputed.

## Non-Duty Disability Retirement

***Eligibility*** - 10 or more years of service.

***Annual Amount*** - Computed as a regular retirement. Minimum benefit to age 65 is 20% of final average compensation.

## Duty Death Before Retirement

***Eligibility*** - No age or service requirements. Must be in receipt of worker's compensation.

***Annual Amount*** - Refund of accumulated contributions or, upon termination of worker's compensation, a benefit to the spouse, unmarried children under 18 and dependent parents equal to the worker's compensation payment.

## Non-Duty Death Before Retirement

***Eligibility*** - 10 or more years of service.

***Annual Amount*** - Computed as a regular retirement but actuarially reduced in accordance with a 100% joint and survivor election.

## Post-Retirement Increases

***Annual increase*** - 1.4% of the base pension for the first 10 years of retirement.

## Member Contributions

| | |
|---|---|
| General, Police Non-Union | 6.0% of annual compensation. |
| Fire | 7.0% of annual compensation, 7.5% effective 7/1/2016, and 8.0% effective 7/1/2017. |
| Police Union | 12.0% of annual contribution, employer responsible for the remainder. Effective 7/1/2016 employees annual contribution will decrease to 11.0%, employer responsible for the remainder. Effective 7/1/2017 employees annual contribution will decrease to 10.0%, employer responsible for the remainder. |

## Membership

General City Union (including WWTP, Water, and Sewage) employees hired on or after January 1, 2005, and General City Non-Union (including WWTP, Water, and Sewage) employees and Police Command Officers hired on or after January 1, 2006 are not covered by this Retirement System.

# Retirants and Beneficiaries Comparative Statement

| Valuation Date Dec. 31 | Added to Rolls No. | Added to Rolls Annual Pensions* | Removed from Rolls No. | Removed from Rolls Annual Pensions | Rolls End of Year No. | Rolls End of Year Annual Pensions | % Incr. in Annual Pensions | Average Pension | Present Value of Pensions | Active Per Retiree | Pensions as a % of Pay |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1992 | 6 | $ 59,014 | 3 | $ 25,569 | 86 | $ 630,121 | 5.6% | $ 7,327 | $6,455,404 | 1.2 | 20.41% |
| 1993 | | 12,468 | 2 | 4,508 | 84 | 638,081 | 1.3 | 7,596 | 6,383,541 | 1.2 | 19.78 |
| 1994 | 5 | 29,230 | 3 | 4,664 | 86 | 662,647 | 3.8 | 7,705 | 6,486,947 | 1.2 | 19.72 |
| 1995 | 2 | 46,143 | 3 | 7,064 | 85 | 701,726 | 5.9 | 8,256 | 6,918,988 | 0.8 | 28.87 |
| 1996 | 2 | 11,415 | 7 | 12,934 | 80 | 700,207 | (0.2) | 8,753 | 6,743,764 | 0.8 | 31.74 |
| 1997 | 2 | 47,931 | 2 | 25,613 | 80 | 722,975 | 3.3 | 9,037 | 6,856,333 | 0.8 | 29.57 |
| 1998 | 4 | 22,510 | 6 | 60,410 | 78 | 685,075 | (5.2) | 8,783 | 6,431,181 | 0.9 | 27.60 |
| 1999 | 3 | 96,306 | 2 | 2,583 | 79 | 778,798 | 7.7 | 9,858 | 7,416,876 | 0.8 | 29.81 |
| 2000 | 2 | 54,935 | 3 | 18,350 | 78 | 815,383 | 4.7 | 10,454 | 7,807,925 | 1.3 | 21.52 |
| 2001 | 8 | 171,244 | 4 | 42,562 | 82 | 944,065 | 15.8 | 11,513 | 9,172,050 | 1.2 | 24.78 |
| 2002 | 7 | 119,045 | 4 | 32,234 | 85 | 1,030,876 | 9.2 | 12,128 | 10,126,061 | 1.2 | 26.84 |
| 2003 | 1 | 17,294 | 10 | 31,998 | 76 | 1,016,172 | (1.4) | 13,371 | 9,841,684 | 1.3 | 25.45 |
| 2004 | 4 | 115,408 | 6 | 33,752 | 74 | 1,097,828 | 8.0 | 14,836 | 10,609,898 | 1.3 | 27.47 |
| 2005 | 3 | 62,062 | 3 | 22,700 | 74 | 1,137,190 | 3.6 | 15,367 | 10,861,853 | 1.3 | 27.32 |
| 2006 | 5 | 207,589 | 2 | 2,865 | 77 | 1,341,914 | 18.0 | 17,427 | 13,043,591 | 1.2 | 34.12 |
| 2007 | 3 | 125,438 | 7 | 37,612 | 73 | 1,429,740 | 6.5 | 19,585 | 13,864,399 | 1.2 | 35.28 |
| 2008 | 1 | 63,419 | 4 | 33,043 | 70 | 1,460,116 | 2.1 | 20,859 | 14,063,424 | 1.3 | 36.12 |
| 2009 | 4 | 95,927 | 2 | 29,187 | 72 | 1,526,856 | 4.6 | 21,206 | 14,688,020 | 1.2 | 38.63 |
| 2010 | 4 | 252,797 | 1 | 22,320 | 75 | 1,757,333 | 15.1 | 23,431 | 16,795,936 | 1.0 | 47.85 |
| 2011 | 4 | 133,694 | 3 | 26,612 | 76 | 1,864,415 | 6.1 | 24,532 | 17,718,104 | 1.0 | 49.76 |
| 2012 | 6 | 247,091 | 4 | 57,258 | 78 | 2,054,248 | 10.2 | 26,337 | 19,536,094 | 0.9 | 61.63 |
| 2013 | 10 | 312,029 | 5 | 57,844 | 83 | 2,308,433 | 12.4 | 27,812 | 23,305,303 @ | 0.8 | 74.25 |
| 2014 | 5 | 163,556 | 4 | 41,881 | 84 | 2,430,108 | 5.3 | 28,930 | 24,627,565 | 0.7 | 82.69 |
| 2015 | 5 | 135,504 | 6 | 78,885 | 83 | 2,486,727 | 2.3 | 29,961 | 24,926,664 | 0.7 | 86.00 |
| 2016 | 6 | 282,359 | 1 | 22,219 | 88 | 2,746,867 | 10.5 | 31,214 | 27,609,693 | 0.6 | 98.58 |

* *Includes post retirement increases.*

@ *After changes in actuarial assumptions/methods.*

# Retirants and Beneficiaries as of December 31, 2016
# Tabulated by Type of Pensions Being Paid

| Type of Pensions Being Paid | No. | Annual Pension |
|---|---|---|
| Age and Service Pensions | | |
| Regular pension - benefit terminating at death | 36 | $1,339,616 |
| Option A pension - 10-year certain and life thereafter | 1 | 35,028 |
| Option B pension - joint and last survivor benefit | 19 | 493,961 |
| Option C pension - modified joint and last survivor | 15 | 597,267 |
| Pension to survivor beneficiary of deceased retirant | 12 | 153,818 |
| Total age and service pensions | 83 | $2,619,690 |
| Casualty Pensions | | |
| Duty disability Regular Pension | | |
| Non-Duty disability Regular Pension | 3 | $ 94,325 |
| Pension to survivor beneficiary of deceased retirant Non-Duty disability | 1 | 13,483 |
| Pension to survivor beneficiary of deceased member Non-Duty death | 1 | 19,369 |
| Total casualty pensions | 5 | $ 127,177 |
| Total Pensions Being Paid | 88 | $2,746,867 |

# Retirants and Beneficiaries as of December 31, 2016
# Tabulated by Attained Ages

| Attained Age | Age and Service | | Casualty | | Totals | |
|---|---|---|---|---|---|---|
| | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances |
| 50 - 54 | 2 | $ 91,929 | 1 | $ 13,483 | 3 | $ 105,412 |
| 55 - 59 | 9 | 322,023 | 1 | 21,182 | 10 | 343,205 |
| 60 - 64 | 18 | 624,998 | 2 | 80,900 | 20 | 705,898 |
| 65 - 69 | 14 | 649,629 | 1 | 11,612 | 15 | 661,241 |
| 70 - 74 | 8 | 306,272 | | | 8 | 306,272 |
| 77 | 4 | 162,109 | | | 4 | 162,109 |
| 78 | 2 | 41,696 | | | 2 | 41,696 |
| 79 | 3 | 87,624 | | | 3 | 87,624 |
| 80 | 4 | 97,068 | | | 4 | 97,068 |
| 81 | 4 | 96,400 | | | 4 | 96,400 |
| 82 | 1 | 1,721 | | | 1 | 1,721 |
| 83 | 2 | 23,624 | | | 2 | 23,624 |
| 84 | 1 | 1,669 | | | 1 | 1,669 |
| 86 | 3 | 43,431 | | | 3 | 43,431 |
| 89 | 1 | 16,646 | | | 1 | 16,646 |
| 90+ | 7 | 52,851 | | | 7 | 52,851 |
| **Totals** | **83** | **$2,619,690** | **5** | **$127,177** | **88** | **$2,746,867** |

Average Age at Retirement: 58.4 years.
Average Age Now: 71.2 years.

# Inactive Members as of December 31, 2016
# Tabulated by Attained Ages

| Attained Ages | No. | Annual Deferred Pension |
|---|---|---|
| 51 | 1 | $ 8,542 |
| 54 | 2 | 54,549 |
| 56 | 1 | 13,257 |
| 57 | 1 | 17,192 |
| **Totals** | **5** | **$93,540** |

Average Age Now: 55.1 years

# Comparative Statement

| Valuation Date Dec. 31 | Active Members | | | | Vested Term. Member | Valuation Payroll | Average | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | General* | P-F | Water | Total | | | Age | Service | Pay | % Change |
| 1997 | 30 | 32 | 3 | 65 | 4 | $ 2,444,848 | 43.9 | 13.6 | $ 37,613 | 5.7% |
| 1998 | 30 | 34 | 3 | 67 | 4 | 2,486,108 | 44.9 | 13.9 | 37,106 | (1.3) |
| 1999 | 30 | 34 | 3 | 67 | 4 | 2,612,348 | 43.6 | 13.1 | 38,990 | 5.1 |
| 2000 | 51 | 32 | 15 | 98 | 6 | 3,788,920 | 44.3 | 13.7 | 38,662 | (0.8) |
| 2001 | 48 | 34 | 15 | 97 | 6 | 3,809,203 | 43.2 | 12.8 | 39,270 | 1.6 |
| 2002 | 52 | 33 | 15 | 100 | 4 | 3,840,501 | 43.6 | 12.7 | 38,405 | (2.2) |
| 2003 | 50 | 34 | 14 | 98 | 3 | 3,993,163 | 44.8 | 13.6 | 40,747 | 6.1 |
| 2004 | 49 | 33 | 15 | 97 | 3 | 3,996,822 | 44.7 | 13.3 | 41,204 | 1.1 |
| 2005 | 49 | 34 | 15 | 98 | 3 | 4,162,066 | 45.1 | 13.6 | 42,470 | 3.1 |
| 2006 | 45 | 29 | 15 | 89 | 3 | 3,933,310 | 44.9 | 13.7 | 44,194 | 4.1 |
| 2007 | 43 | 33 | 14 | 90 | 4 | 4,052,300 | 47.0 | 14.9 | 45,026 | 1.9 |
| 2008 | 43 | 32 | 13 | 88 | 4 | 4,042,417 | 46.5 | 14.8 | 45,937 | 2.0 |
| 2009 | 40 | 32 | 11 | 83 | 3 | 3,952,336 | 46.4 | 15.4 | 47,619 | 3.7 |
| 2010 | 37 | 29 | 10 | 76 | 3 | 3,672,267 | 47.4 | 15.9 | 48,319 | 1.5 |
| 2011 | 36 | 31 | 10 | 77 | 3 | 3,746,852 | 47.2 | 15.5 | 48,660 | 0.7 |
| 2012 | 33 | 29 | 7 | 69 | 6 | 3,333,049 | 47.0 | 15.5 | 48,305 | (0.7) |
| 2013 | 29 | 30 | 5 | 64 | 6 | 3,108,992 | 45.6 | 14.1 | 48,578 | 0.6 |
| 2014 | 26 | 28 | 4 | 58 | 6 | 2,938,821 | 46.0 | 14.3 | 50,669 | 4.3 |
| 2015 | 27 | 29 | * | 56 | 6 | 2,891,530 | 45.6 | 13.8 | 51,634 | 1.9 |
| **2016** | **23** | **29** | ***** | **52** | **5** | **2,786,412** | **44.8** | **12.9** | **53,585** | **3.8** |

* *Beginning with the December 31, 2015 valuation, General members includes all non-police/fire divisions.*

*Valuation payroll in 2009 was adjusted to account for 27 pay periods during the year.*
*Valuation payroll in 2012 was adjusted to remove the one-time payout of unused sick leave for Firefighters.*

# Active Members Added to and Removed from Rolls

| Year Ended | Number Added During Year | Terminations During Year | | | | | | | | Active Members End of Year |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Normal Retirement | | Disabled | | Died-in-Service | | Other Withdrawal | | |
| | A | A | E | A | E | A | E | A | E | |
| 2007 | 6 | 2 | 0.9 | | 0.2 | | 0.2 | 3 | 2.6 | 90 |
| 2008 | | 1 | 2.7 | | 0.2 | | 0.2 | 1 | 2.7 | 88 |
| 2009 | | 4 | 3.2 | | 0.2 | | 0.2 | 1 | 2.4 | 83 |
| 2010 | | 4 | 1.2 | | 0.2 | | 0.2 | 3 | 2.1 | 76 |
| 2011 | 7 | 3 | 1.3 | | 0.2 | 1 | 0.2 | 2 | 1.7 | 77 |
| 2012 | 3 | 5 | 1.9 | | 0.2 | | 0.2 | 6 | 2.2 | 69 |
| 2013 | 5 | 7 | 1.6 | 1 | 0.2 | | 0.2 | 2 | 2.0 | 64 |
| 2014 | 2 | 4 | 1.5 | | 0.2 | | 0.1 | 4 | 1.8 | 58 |
| 2015 | 3 | 3 | 2.6 | | 0.2 | | 0.1 | 2 | 1.5 | 56 |
| 2016 | 3 | 5 | 1.6 | | 0.2 | | 0.1 | 2 | 1.5 | 52 |
| 2007-2016 | 29 | 38 | 18.5 | 1 | 2.0 | 1 | 1.7 | 26 | 20.5 | |

*A represents actual number.*
*E represents expected number.*

# General Members as of December 31, 2016
# By Age and Years of Service

| Attained Age | Years of Service on Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 30-34 | | | | | | | | | |
| 35-39 | | | 1 | | | | | 1 | $ 19,063 |
| 40-44 | | | 2 | | | | | 2 | 112,622 |
| 45-49 | | | | | | 1 | | 1 | 66,661 |
| 50-54 | | | 1 | 5 | 1 | | | 7 | 300,533 |
| 55-59 | | | 2 | 5 | 1 | 1 | 1 | 10 | 463,128 |
| 60-64 | | | | 1 | | 1 | | 2 | 117,627 |
| 65-69 | | | | | | | | | |
| **Totals** | **0** | **0** | **6** | **11** | **2** | **3** | **1** | **23** | **$1,079,634** |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

**Group Averages:**

Age: 53.2 years
Service: 18.8 years
Annual Pay: $46,941

# Police Members as of December 31, 2016
# By Age and Years of Service

| Attained Age | Years of Service on Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 20-24 | | | | | | | | | |
| 25-29 | 1 | 1 | | | | | | 2 | $ 119,239 |
| 30-34 | 2 | 1 | 1 | | | | | 4 | 235,589 |
| 35-39 | 2 | | 2 | | | | | 4 | 237,485 |
| 40-44 | | | | 1 | | | | 1 | 64,553 |
| 45-49 | | | | | | | | | |
| 50-54 | | | | | | | | | |
| 55-59 | | | | | | | | | |
| 60-64 | | | | | | | | | |
| **Totals** | **5** | **2** | **3** | **1** | **0** | **0** | **0** | **11** | $ 656,866 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

**Group Averages:**

Age: 34.2 years
Service: 6.9 years
Annual Pay: $59,715

# Fire Department Members as of December 31, 2016
# By Age and Years of Service

| Attained Age | Years of Service on Valuation Date | | | | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 20-24 | 2 | | | | | | | 2 | $ 94,165 |
| 25-29 | 2 | | | | | | | 2 | 99,232 |
| 30-34 | | 1 | | | | | | 1 | 60,037 |
| 35-39 | | 1 | 1 | | | | | 2 | 104,370 |
| 40-44 | 2 | 2 | | | | | | 4 | 243,107 |
| 45-49 | | | 1 | 1 | 1 | | | 3 | 177,264 |
| 50-54 | | | | 2 | 1 | | | 3 | 208,782 |
| 55-59 | | | | 1 | | | | 1 | 62,955 |
| 60-64 | | | | | | | | | |
| **Totals** | **6** | **4** | **2** | **4** | **2** | **0** | **0** | **18** | $ 1,049,912 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

**Group Averages:**

Age: 40.7 years
Service: 9.2 years
Annual Pay: $58,328

# Development of Funding Value of Retirement System Assets

| Year Ended December 31: | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| A. Funding Value Beginning of Year | $32,558,582 | $33,296,146 | | | |
| B. Market Value End of Year | 31,948,137 | 31,715,358 | | | |
| C. Market Value Beginning of Year | 33,683,719 | 31,948,137 | | | |
| D. Non-Investment Net Cash Flow | (1,670,920) | (1,847,698) | | | |
| ***Investment Income %*** | 7.25% | 7.25% | | | |
| E. Investment Income | | | | | |
| E1. Market Total: B-C-D | (64,662) | 1,614,919 | | | |
| E2. Amount for Immediate Recognition | 2,299,926 | 2,346,992 | | | |
| E3. Amount for Phased-In Recognition: E1-E2 | (2,364,588) | (732,073) | | | |
| F. Phased-In Recognition of Investment Income | | | | | |
| F1. Current Year: 0.25 x E3 | (591,147) | (183,018) | | | |
| F2. First Prior Year | (108,845) | (591,147) | $ (183,018) | | |
| F3. Second Prior Year | 643,121 | (108,845) | (591,147) | $ (183,018) | |
| F4. Third Prior Year | 165,429 | 643,122 | (108,845) | (591,147) | $ (183,019) |
| F5. Total Recognized Investment Gain | 108,558 | (239,888) | (883,010) | (774,165) | (183,019) |
| G. Funding Value End of Year: A+D+E2+F5 | $33,296,146 | $33,555,552 | | | |
| H. Difference between Market & Funding Value | $ (1,348,009) | $ (1,840,194) | | | |
| I. Funding Value Recognized Rate of Return | 7.59% | 6.51% | | | |
| J. Market Value Recognized Rate of Return | (0.20)% | 5.21% | | | |

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is unbiased with respect to Market Value. At any time it may be either greater or less than Market Value. If actual and assumed rates of retirement are exactly equal for 3 consecutive years, the Funding Value will become equal to Market Value.

# Summary of
# Asset Information as of December 31, 2016
# Furnished for Valuation

## BALANCE SHEET

| Valuation Assets (Funding Value) | | Reserves | |
|---|---|---|---|
| Cash & Equivalents | $ 101,682 | Employees' Contributions | $ 3,121,008 |
| U.S. Notes & Bills | 0 | Employer Contributions | (99,198) |
| Short-term Investment Funds | 601,726 | Retired Benefit Payments | 27,415,533 |
| Common Stocks | 21,014,383 | Unallocated Reserves | 1,278,015 |
| Preferred Stocks | 87,375 | | |
| Equities - Other | 1,691,692 | | |
| Bonds | 8,237,749 | | |
| Accounts Payable | (19,249) | | |
| Net System Assets (market value) | $31,715,358 | Total Reserves | $31,715,358 |
| Funding Value Adjustment | 1,840,194 | Funding Value Adjustment | 1,840,194 |
| Total Valuation Assets | $33,555,552 | Total Valuation Assets | $33,555,552 |

## REVENUES AND EXPENDITURES

| | 2016 | 2015 |
|---|---|---|
| Valuation Assets - January 1 | $33,296,146 | $32,558,582 |
| Revenues | | |
| Employees' contributions | 234,195 | 238,860 |
| Employer contributions | 629,143 | 600,769 |
| Net Investment income | 2,107,104 | 2,408,484 |
| Expenditures | | |
| Benefit payments | 2,604,576 | 2,504,312 |
| Refund of member contributions | 106,460 | 6,237 |
| Valuation Assets - December 31 | $33,555,552 | $33,296,146 |

# SECTION C

## OPERATION OF THE SYSTEM

# Financial Objective

***Benefit Promises Made Which Must Be Paid For***. A retirement system is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an "IOU" which reads: *"The Employees Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."*

The principal related financial question is: ***When shall the money required to cover the "IOU" be contributed?*** This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The Constitution of the State of Michigan is directed to the question:

> *"Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."*

This Retirement System meets this constitutional requirement by having the following ***Financial Objective: To establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year to year*** and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

***Normal Cost*** (the present value of benefits likely to be paid on account of members' service being rendered in the current year).

... plus ...

***Interest on the Unfunded Actuarial Accrued Liability*** (the difference between the actuarial accrued liability and current system assets).

If contributions to the retirement system are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement systems must operate; that is:

$$B = C + I - E$$

**Benefit** payments to any group of members and their beneficiaries cannot exceed the sum of:

**Contributions** received on behalf of the group

... plus ...

**Investment** earnings on contributions received and not required for immediate payment of benefits

... minus ...

**Expenses** incurred in operating the program.

There are retirement systems designed to defer the bulk of contributions far into the future. The present contribution rate for such systems is artificially low. The fact that the contribution rate is destined to increase relentlessly to a much higher level is often ignored. ***This method of financing is prohibited in Michigan by the state constitution***.

A by-product of the level percent-of-payroll contributions objective is the accumulation of invested assets. Investment income on accumulated assets becomes a major contributor to the retirement system, and the amount is directly related to the amount of contributions and investment performance.

***Computed Contribution Rate Needed To Finance Benefits.*** From a given schedule of benefits and from the data furnished, the actuary calculated the contribution rate ***by means of an actuarial valuation*** - the technique of assigning monetary values to the risks assumed in operating a retirement system.

# SECTION D

## VALUATION METHODS AND ASSUMPTIONS

# Actuarial Cost Method

**Normal cost and the allocation of benefit values** between service rendered before and after the valuation date was determined using an individual entry-age normal cost method having the following characteristics:

- The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; death or disability;

- Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

***UAAL (as well as Assets in excess of Actuarial Accrued Liabilities)*** were amortized by over a 12-year closed period (from July 1, 2017). The amortization method was level percent-of-payroll for the open groups and level dollar for the closed groups.

Unless otherwise noted, the rationale for all assumption and methods was the 2013 method and assumption review. Assumptions are forward looking.

# Asset Valuation Method

An essential step in the valuation process is comparing valuation assets with computed liabilities. Valuation assets are those assets that are recognized for funding purposes.

Asset valuation methods are distinguished by the timing of the recognition of investment income. Total investment income is the sum of ordinary income and capital value changes. Under a pure market value approach, ordinary investment income and all capital value changes would be recognized immediately. Because of market volatility, use of pure market values in retirement funding can result in volatile contribution rates and unstable financial ratios, contrary to management objectives.

Under the current asset valuation method (see page B-11), assumed investment return is recognized fully each year. Differences between actual and assumed investment return are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, the funding value will tend to be less than the market value. Conversely, during periods when investment performance is less than the assumed rate, funding value will tend to be greater than market value.

# Member Data

Member Data was submitted by the Treasurer and was found to be reasonable and complete. After review and reconciliation, we submitted a few minor questions. The result was clarification and one status change. No other changes were made to the data submitted by the treasurer.

# Actuarial Assumptions Used for the Valuations

The contribution requirements and benefit values of the System are calculated by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost method described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by the assets of the Fund;
- Patterns of pay increases to members;
- Rates of mortality among members, retirants and beneficiaries;
- Rates of withdrawal of active members (without entitlement to a retirement benefit);
- Rates of disability among members; and
- The age patterns of actual retirements.

The monetary effect of each assumption is calculated for as long as a present covered person survives - - - a period of time which can be as long as a century.

Actual experience of the System will not coincide exactly with assumed experience, regardless of the choice of the assumptions. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year to year fluctuations).

***The assumed rate of investment return*** was 7.25% (net of expenses) a year, compounded annually. This assumption is used to make money payable at one point in time equal in value to an amount of money payable at another point in time. The assumed real rate of return (the net return in excess of the wage inflation rate) was 4.25%. Economic experience during the last 5 years has been as follows:

| | Year Ending December 31 | | | | | 5-Year |
|---|---|---|---|---|---|---|
| | 2016 | 2015 | 2014 | 2013 | 2012 | Average |
| 1) Nominal rate of return* | 6.5% | 7.6% | 7.0% | 8.3% | 8.0% | 7.5% |
| 2) Increase in CPI | 2.1 | 0.7 | 0.8 | 1.5 | 1.7 | 1.4% |
| 3) Average salary increase | 3.8 | 1.9 | 4.3 | 0.6 | (0.7) | 2.0% |
| 4) Real return | | | | | | |
| - investment purposes | | | | | | 6.1% |
| - funding purposes | | | | | | 5.5% |
| - assumption | | | | | | 4.25% |

* *The nominal rate of return was computed using the approximate formula: i = I divided by 1/2 (A+B-I), where I is realized investment income net of expenses, A is the beginning of year asset value and B is the end of year asset value.*

***The rates of salary increase*** used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

**Salary Increase Assumptions for an Individual Member**

| Years of Service | Base (Economic) | Merit & Seniority General |
|---|---|---|
| 1 | 3.0% | 0.0% |
| 2 | 3.0% | 0.0% |
| 3 | 3.0% | 0.0% |
| 4 | 3.0% | 0.0% |
| 5 | 3.0% | 0.0% |
| 6 | 3.0% | 0.0% |
| 7 & Up | 3.0% | 0.0% |

**Salary Increase Assumptions for an Individual Member**

| Years of Service | Base (Economic) | Merit & Seniority Police | Merit & Seniority Fire |
|---|---|---|---|
| 1 | 3.0% | 10.0% | 5.0% |
| 2 | 3.0% | 5.0% | 4.5% |
| 3 | 3.0% | 1.5% | 4.0% |
| 4 | 3.0% | 1.0% | 3.5% |
| 5 | 3.0% | 0.8% | 3.0% |
| 6 | 3.0% | 0.5% | 2.5% |
| 7 & Up | 3.0% | 0.0% | 0.0% |

If the number of active members remains constant, then the total active member payroll will increase 3.0% annually, the base portion of the individual salary increase assumptions.

***The rate of price inflation*** was assumed to be 2.5%. Although this assumption is not directly used in the valuation, it was used to determine the reasonable range for the investment return assumption.

***The real wage growth*** was assumed to be 0.5%, resulting in a total wage inflation assumption of 3.0%, as shown in the salary increase tables.

***The rate of payroll growth*** was assumed to be 3.0% for the open groups. This assumption was used to finance UAAL for the open groups (level dollar financing was used for the closed groups).

These economic assumptions were first used for the December 31, 2013 valuation.

***The mortality table*** used was the RP-2000 Combined Healthy Mortality Table projected to 2020 using Projection Scale AA. A margin for future mortality improvements is contained in the projection.

| Sample Attained Ages | Present Value of $1 Monthly for Life | | Future Life Expectancy (years) | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| 45 | $154.72 | $156.27 | 37.54 | 39.46 |
| 50 | 148.84 | 150.73 | 32.77 | 34.63 |
| 55 | 140.89 | 143.37 | 28.04 | 29.88 |
| 60 | 130.74 | 134.14 | 23.47 | 25.31 |
| 65 | 118.50 | 123.10 | 19.17 | 21.02 |
| 70 | 104.41 | 110.47 | 15.22 | 17.06 |
| 75 | 88.00 | 96.22 | 11.58 | 13.47 |
| 80 | 70.35 | 80.35 | 8.42 | 10.23 |

This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. For valuation purposes, pre-retirement deaths are assumed to be non-duty. For disability purposes, the mortality is set forward ten years.

This assumption was first used for the December 31, 2013 valuation.

***The rates of retirement*** used to measure the probability of eligible members retiring during the next year were as follows:

| Retirement Ages | Percent of Eligible Active Members Retiring within Next Year | | | |
|---|---|---|---|---|
| | General, Sewage, Water, and WWTP | | | |
| | Non-Union | Union | Police | Fire |
| 45-49 | | | 20% | 20% |
| 50 | | | 20% | 20% |
| 51 | | | 20% | 15% |
| 52 | | | 20% | 10% |
| 53 | | | 20% | 10% |
| 54 | | | 20% | 10% |
| 55 | 20% | 20% | 20% | 10% |
| 56 | 15% | 15% | 20% | 10% |
| 57 | 10% | 10% | 20% | 10% |
| 58 | 10% | 10% | 20% | 10% |
| 59 | 10% | 10% | 20% | 20% |
| 60 | 10% | 10% | 100% | 100% |
| 61 | 10% | 10% | | |
| 62 | 15% | 15% | | |
| 63 | 25% | 25% | | |
| 64 | 30% | 30% | | |
| 65 | 100% | 100% | | |

This assumption was first used for the December 31, 2013 valuation.

***Rates of separation from active membership*** were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

| Sample Ages | Years of Service | % of Active Members Separating within One Year | | |
|---|---|---|---|---|
| | | General | Fire | Police |
| ALL | 0 | 20.00% | 12.00% | 20.00% |
| | 1 | 15.00% | 9.00% | 15.00% |
| | 2 | 10.00% | 7.00% | 10.00% |
| | 3 | 8.00% | 5.00% | 8.00% |
| | 4 | 7.00% | 4.50% | 7.00% |
| 25 | 5 & Over | 4.50% | 4.50% | 6.75% |
| 30 | | 3.90% | 4.35% | 5.85% |
| 35 | | 2.30% | 3.50% | 3.45% |
| 40 | | 0.90% | 2.10% | 1.35% |
| 45 | | 0.50% | 1.00% | 0.75% |
| 50 | | 0.50% | 0.62% | 0.75% |
| 55 | | 0.50% | 0.50% | 0.75% |
| 60 | | 0.50% | 0.50% | 0.75% |

This assumption was first used for the December 31, 2013 valuation.

***Rates of disability*** were as follows:

| Sample Ages | % of Active Members Becoming Disabled within Next Year | |
|---|---|---|
| | General, Water, WWTP & Sewage | Police and Fire |
| 20 | 0.02% | 0.05% |
| 25 | 0.02% | 0.08% |
| 30 | 0.02% | 0.12% |
| 35 | 0.03% | 0.21% |
| 40 | 0.07% | 0.31% |
| 45 | 0.13% | 0.46% |
| 50 | 0.27% | 0.73% |
| 55 | 0.44% | 1.23% |
| 60 | 0.67% | 1.77% |
| 65 | 1.00% | 1.58% |

For valuation purposes, pre-retirement disabilities are assumed to be non-duty.

This assumption was first used for the December 31, 2013 valuation.

# Summary of Assumptions

| | |
|---|---|
| **Marriage Assumption:** | 100% of males and females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses. |
| **Decrement Timing:** | Normal Retirement is assumed to occur at the beginning of the year and all other decrements are assumed to occur at the end of the year. |
| **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. |
| **Benefit Service:** | Exact fractional service is used to determine the amount of benefit payable. |
| **Decrement Relativity:** | Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects. |
| **Decrement Operation:** | Disability and mortality decrements do not operate during the first 5 years of service. Disability and turnover do not operate during retirement eligibility. |
| **Normal Form of Benefit:** | The assumed normal form of benefit is the straight life form. |
| **Liability Adjustments:** | Active member liabilities and normal costs were increased by 10% for Police, 7% for Fire hired before 6/30/1993, 4% for Fire hired after 6/30/1993, and 8% for all others to model end of career payments that are included in final average compensation (such as sick leave payouts). |
| **Incidence of Contributions:** | Contributions are assumed to be received continuously throughout the year. |
| **Police Patrol Refund Cost:** | Normal cost and accrued liabilities for Police Patrol refunds were based on an estimated long-term member contribution rate of 10%. |
| **Fire Refund Cost:** | Normal cost and accrued liabilities for Fire refunds were based on an estimated long-term member contribution rate of 8.0%. |

# Glossary

**Actuarial Accrued Liability.** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

**Accrued Service.** The service credited under the plan which was rendered before the date of the actuarial valuation.

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turn-over and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

**Actuarial Equivalent.** A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

**Experience Gain (Loss).** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

**Funding Value of Assets.** The value of assets derived by spreading the difference between actual investment return and expected investment return in equal dollar installments over four years. This treatment removes the timing of investment activities from the valuation process.

**Normal Cost.** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

**Reserve Account.** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

**Unfunded Actuarial Accrued Liability.** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
One Towne Square
Suite 800
Southfield, MI 48076-3723
248.799.9000 phone
248.799.9020 fax
www.gabrielroeder.com

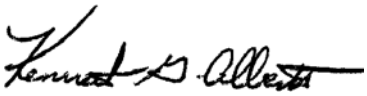
April 21, 2017

Ms. Andrea K. Smith
City Treasurer
City of Owosso Employees Retirement System
City Hall
301 W. Main Street
Owosso, Michigan 48867-2958

Dear Ms. Smith:

Enclosed are thirteen copies of the Seventy-Second Annual Actuarial Valuation report for the City of Owosso Employees Retirement System.

Sincerely yours,



Kenneth G. Alberts

KGA:mrb

cc: Mr. Doug Deeter (Rehmann Robson) E-Mail
Ms. Christine M. Wilson (Graystone Consulting) E-Mail