NEBRASKA RETIREMENT SYSTEMS COMMITTEE

2018

Report on Political Subdivision Underfunded Defined Benefit Retirement Plans

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Senator Brett Lindstrom, Vice-Chair
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2018 Summary of Underfunded Political Subdivision Defined Benefit Plan Reports

Background

In 2014 LB 759 was enacted to require reporting by political subdivisions with defined benefit plans and provide oversight by the Nebraska Public Employees Retirement Committee of these entities. The bill was codified at Neb. Rev. Stat. 13-2402, and requires any governing entity that offers a defined benefit plan which was open to new employees on January 2004 to file a report with the Nebraska Retirement Systems Committee if the most recent actuarial valuation report indicates that (1) the contributions do not equal the actuarial requirement for funding or (2) the funded ratio of the plan is less than eighty percent. The report must include, at a minimum, an analysis of the future benefit changes, contribution changes, or other proposed corrective action to improve the plan's funding condition.

Under Neb. Rev. Stat. 13-2402, the Nebraska Retirement Systems Committee may require the entity to present the report to the Committee at a public hearing. If a governmental entity fails to file the required information with the Committee, the State Auditor is authorized to audit the public pension system, or cause it to be audited at the political subdivision's own expense. The annual reporting requirement began November 1, 2014. In 2015, the reporting date was changed to October 15 of each year.

2018 Underfunded Pension Plans

In 2017 eight defined benefit plans were funded below the 80% funding level. However, the Lincoln Police and Fire Plan reached 80.8% funding level in their most recent valuation report so they were not required to file a report with the Nebraska Retirement Systems Committee in 2018. Below is a list of the seven current underfunded political subdivisions and a summary of the 2018 and 2017 funding status for each plan:

- Douglas County Employees
- Eastern Nebraska Health Agency
- Metro Area Transit Hourly Employees
- Omaha Civilian Employees
- Omaha Police and Fire
- Omaha Public Power District
- Omaha Public Schools – Omaha School Employees Retirement

POLITICAL SUBDIVISION	2018 FUNDING STATUS	2017 FUNDING STATUS
Douglas County Employees	68.0%	67.2%
Eastern Nebraska Health Agency	74.0%	N.A. Valuation reports are biennial 67.3% in 2016
Metro Area Transit Hourly Employees	77.0%	71.0%
Omaha Civilian Employees	53.0%	56.0%
Omaha Police and Fire	52.0%	51.0%
Omaha Public Power District	70.0%	69.2%
Omaha Public Schools (OSERS plan)	64.0%	65.0%

Required Reporting Information

The Committee created a Reporting Form which was forwarded to each political subdivision in September 2018. Each entity was asked to submit the information identified on the Form. A public hearing was conducted by the Committee on December 3, 2018 at which time they presented the following information:

1. Please list the following information for **plan years 2014 through current plan year 2018:**

   a. Funding status
   b. Assumed rate of return
   c. Actual investment return
   d. Member and employer contribution rates -- <u>percentage</u>
   e. Normal cost – <u>percentage</u>
   f. Actuarially required contribution (ARC) – <u>percentage & dollar amount</u>
   g. ARC contribution <u>– actual dollar amount contributed & percentage of ARC actually contributed</u>

2. Provide a brief narrative of the circumstances that led to the current underfunding of the retirement plan.

3. Identify any changes in the actuarial methods and/or assumptions since the previous actuarial valuation report? If so, please describe.

4. Describe corrective actions implemented to improve the funding status of the plan including, but not limited to, benefit changes, increased contribution rates and/or employer contributions. Provide a copy of any actuarial projections based on these changes.

5. Describe any recent or ongoing negotiations with bargaining groups that may impact the funding of the plan.

6. Provide a copy of the most recent Actuarial Experience Study conducted on the plan.

7. Identify the current assumed rate of return. Describe any recent changes to this rate and if there are plans to review the rate in the upcoming year.

8. Provide a copy of the most recent actuarial valuation report. If the valuation report is completed biannually (or less often), include an updated report for the interim year/s, if available.

Reporting materials provided by each governmental entity are included in the Appendices to this Report.

Summaries of Plan Funding and Benefit Changes

Douglas County Employees:

Over a 5-year period since the Nebraska Retirement Systems Committee has begun oversight, the funding ratio of the Douglas County Employees Plan has increased from 64.6% to 68.0% -- aided in part by a 16.8% investment return on assets. The actuary projects that if all assumptions are met the plan will reach 74.7% in 2023; 79.6% in 2028, 86.3% in 2033 and 96.2% in 2038. It is projected to reach 100% funding status by the year 2040.

There are several ongoing negotiations with collective bargaining groups that represent County employees who are requesting the County to institute a DROP program for their members. The adoption of a DROP program could impact funding of the County's pension plan. At this time, County management has not agreed to any of the proposals to institute a DROP program.

Douglas County Employees Plan Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	CNTY RATES	UAL	% OF ARC PAID
2018	68.0%	7.5%	16.8%	11.2%	18.0%	8.5%	8.5%	$148,540,000	94.4%
2017	67.2%	7.5%	6.8%	10.9%	17.5%	8.5%	8.5%	$140,285,000	104.7%
2016	67.3%	7.5%	2.3%	10.7%	15.8%	8.5%	8.5%	$133,784,248	110.8%
2015	66.8%	7.5%	5.2%	11.3%	16.5%	8.5%	8.5%	$131,057,379	111.8%
2014	64.6%	7.5%	18.9%	11.5%	17.0%	8.5%	8.5%	$134,897,663	104.3%

Eastern Nebraska Human Services Agency:

The Agency conducts Actuarial Valuations on a biennial basis. The actual investment return was 11.7% and the current funding level is 74%. The assumed rate of 7.0% has not changed since the inception of the plan. The Agency paid 108.7% of its ARC in 2017. There is no information yet on the amount of ARC paid in 2018.

For the 2018 actuarial valuation, the mortality table was updated to the Static IRS 2018 annuitant-distinct mortality table, based on the RP 2014 mortality table. The unfunded accrued liability amortization period was changed as of January 1, 2018 from a 30 year open amortization to a 25 year closed layer amortization. The plan funding ratio is expected to reach 100% in 2042 based on the January 1, 2018 census data and assets and projected with assumptions as described in the January 1, 2018 valuation report. The agency has been increasing employer contributions by one-half percent annually since 2010. Under the assumptions applied, a funded ratio greater than 100% will be attained in 24 years, with the forecasted funding status exceeding 80% in 6 years.

Eastern Nebraska Human Services Agency Plan Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	AGENCY RATES	UAL	% OF ARC PAID
2018	74%	7%	11.7%	74%	12.19%	2.75%	9.5%	$14,245,604	TBD
2017	N.A.	7%	6.8%	N.A.	11.55%	2.75%	9%	N.A.	108.7%
2016	71%	7%	6.8%	7.0%	11.55%	2.75%	8.5%	$13,710,422	106.9%
2015	N.A.	7%	0.2%	N.A.	10.77%	2.75%	8.0%	N.A.	108.3%
2014	76%	7%	15.6%	7.1%	10.77%	2.75%	7.5%	$ 9,981,149	102.2%

*Eastern Nebraska Human Services Agency Plan year ends December 31 so the current year Valuation Report is not yet available. Actuarial Valuations are conducted every other year.

Metro Area Transit Hourly Employees:

The current funding ratio is 77% a six-point increase from 71% in 2017. The investment return was 13.35%. Due to lower capital market expectations, the interest rates used to value liabilities have been decreased several times in the last nine years [2009 – reduced from 8% to 7.5%; 2015 reduced from 7.5% to 7.0%; 2016 reduced from 7.0% to 6.75%] and by 25 basis points in the valuation for 2016, which was also the interest rate used for the 2017 valuation.

The employer's contribution rate changes from 6.5% of payroll to 7.5% and the employee's contribution rate changed from 6% to 7%. For those employees hired on or after January 1, 2018, the Pension Committee:

➤ changed the normal retirement date from age 65 to the age when the employee reaches full retirement for purposes of receiving Social Security benefits

➤ eliminated the early retirement option

➤ the benefit factor percentage used in the calculation of the monthly benefit was changed to a tiered structure based on years of service in lieu of the current method of using the same benefit factor percentage regardless of years of service

The collective bargaining agreement between Metro and the Transport Workers Union was renegotiated during 2017. Pension funding is one of the major components of these negotiations. Past and future negotiations include reopeners in each year in order to address required matters that might arise prior to expiration of the bargaining agreement.

Metro Area Transit Hourly Employees Summary

YEAR	FUNDED RATIO	ASSUMED INVEST. RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	CNTY RATES	UAL	% OF ARC PAID
2018	77%	6.75%	13.35%	7.21%	N.A.	7.0%	7.5%*	$11.453,127	N.A.
2017	71%	6.75%	5.80%	7.39%	N.A.	6.0%	6.5%*	$11.424,110	N.A.
2016	72%	6.75%	-1.50%	7.35%	N.A.	6.0%	6.5%	$10,885,560	78.30%
2015	76%	7.0%	6.10%	7.39%	N.A.	6.0%	6.5%	$10,912,605	88.30%
2014	76%	7.0%	14.20%	7.28%	N.A.	6.0%	6.5%	N.A.	84.30%

*The employer made a one-time lump sum contribution to the Plan equal to 1% of the total of the active Plan participants' compensation for the period beginning on July 1, 2016 and ending on August 31, 2017, making the effective employer contribution rate 7.5% since July 1, 2016.

Omaha Civilian Employees:

As a result of the 2018 Experience Study, a number of economic and demographic assumptions were adopted. The assumed rate of return for the system was lowered to 7.5% from 8.0% and new mortality tables were adopted. As a result, as of January 1, 2018 the system had a funding ratio of 53% -- down from 55% in 2017. The actuarial contribution to the system had improved for a number of years, but as a result of the change in assumptions, there is a shortfall in the actuarial required contribution of 2.206% after a couple of years where there was an excess. The UAL increased from approximately $197 million to $233 million.

The unfunded actuarial liability (UAL) is funded on a "layered" basis, with the initial base funded as a level-percent of payroll over a 26-year closed period that began January 1, 2016. Each experience base is funded as a level percent of payroll over a 20-year closed period.

It is reported that additional savings should be seen in future years as members covered by the provisions of the Cash Balance Plan for employees hired on or after 3/1/2015 continue to grow. The most recent projections show the system will reach fully funded status in 30 years.

The City has commenced negotiations with the bargaining groups for 2018 and beyond. The City does not anticipate that the labor agreements will address further pension changes/reform.

Omaha Civilian Employees Plan Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	CITY RATES	UAL	% OF ARC PAID
2018	53%	7.5%	9.7%	9.72%	27.740%	10.075%	18.775%	$233,286,679	108.36%
2017	55%	8%	3.1%	9.843%	27.526%	10.075%	18.775%	$197,537,024	84.50%
2016	56%	8%	4.7%	9.881%	33.724%	10.075%	18.775%	$193,616,559	71.82%
2015	54%	8%	16%	13.231%	38.454%	10.075%	17.775%	$188,911,964	68%
2014	54%	8%	11%	13.231%	38.454%	10.075%	13.77%	$205,174,423	41.33%

The Omaha Civilian Employees Plan year is based on the calendar year.

Omaha Police and Fire:

An Experience Study was completed in March 2018 and recommended a number of economic and demographic changes including a lowering of the investment return assumption from 8.0% to 7.75%. The UAL increased from approximately $612 million to approximately $649 million. The funded ratio of the plan is 52% -- 1% higher than the 51% funding ratio the previous year. However, the significant city contribution increases and benefit reductions negotiated in 2010 with the police union and 2012 with the fire union have begun to have a positive effect. In 2013 the funding ratio was 44% and has increased 8% in the past 5 years.

The employees in this plan are represented by four bargaining groups. Three of the groups have collective bargaining agreements in place through 2018. The fourth group, the Omaha Police Officers Association, entered into a collective bargaining agreement for 2015 through 2020; the agreement was effective in March 2017. As part of Police Officers agreement, the City and the employees have agreed to contribute an additional 0.75% of wages into the system for 2018 to 2020. The widow's pension provision was changed to provide that a widow's pension is only payable if the officer and spouse were married as of the date of the officer's retirement. The most recent projection had the system fully funded in approximately 21 to 22 years, assuming all assumptions are met.

Omaha Police and Fire Plan Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EMPLOYEE RATES	CITY RATES	UAL	% OF ARC PAID
2018	52%	7.75%	14.9%	22.21%	53.199%	15.35%-17.23%	32.97%-33.67%	$648,833,922	Pending
2017	52%	8%	15.0%	21.99%	50.212%	15.35%-17.23%	32.97%-33.67%	$611,737,378	101.81%
2016	51%	8%	9.1%	22.14%	50.097%	15.35%-17.23%	32.97%-33.67%	$602,562,135	100.54%
2015	50%	8%	0.7%	22.191%	50.031%	16.195%	34.386%	$598,810,,636	96%
2014	47%	8%	4.9%	23.103%	52.138%	15.35%-17.23%	32.98 – 33.67%	$622,607,530	83%

Omaha Public Power District:

OPPD Plan year is based on the calendar year so the 2017 Valuation Report is not yet available. In 2017 the funding ratio was slightly up at 70.0% over the previous year status of 69.2%. The investment return in 2017 was strong at 16.49%.

OPPD has consistently paid 100% of its ARC in each of the previous five reporting years. In addition, as a result of the Experience Study conducted in 2016 the assumed rate of return was decreased from 7.75% to 7.0%.

OPPD has been working to address funding and long-term sustainability of the plan. Negotiations with bargaining groups occur on an ongoing basis. In 2012 the Board moved to a Cash Balance Plan for employees hired on and after January 1, 2013. In 2013 the District changed early retirement eligibility, which generally prevents employees from receiving early retirement benefits before age 55. In 2017 negotiations with bargaining units were completed and resulted in an increase in employee contributions, which will gradually increase beginning in 2018 at 6.7% through 2022 when the employee contribution rate will be 9.0%.

Omaha Public Power District Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	DISTRICT RATES	UAL	% OF ARC PAID
2018*	N.A	N.A	N.A	N.A	N.A	N.A	N.A		N.A
2017	70.0%	7.0%	16.49%	12.1%	29.8%	6.7%	29.8%	$442,395,055	100%
2016	69.2%	7.0%	6.74%	11.1%	28.3%	6.2%	25.2%	$448,100,797	100%
2015	72.4%	7.75%	-1.07%	11.83%	25.2%	6.2%	17.53%	$433,114,517	100%
2014	73.9%	7.75%	3.85%	11.59%	23.73%	6.2%	21.11%		100%

*Omaha Public Power District Plan year ends December 31 so the 2018 Valuation Report is not yet available.

Omaha Public School (OSERS):

Last year the OSERS' Plan funding status decreased to 64% with an unfunded actuarial liability of $771 million. As a result, last year the OSERS plan was added to the list of political subdivisions that must report to the Nebraska Retirement Systems Committee under Neb. Rev. Stat. 13-2402.

In 2018 the legislature passed LB 1005 which included portions of AM1758 to LB 548 which incorporated the assumptions from the most recent Experience Study, including the updated mortality tables. It also inserted a new definition of "solvency" as the actuarially required contribution amount as annotated in each annual valuation report. It also requires the school district to deposit the annual ARC into the retirement fund by August 31 of each year which is the last day of the school fiscal year. In July 2018, OPS deposited $18.9 million into the OSERS Retirement Fund in order to meet this requirement.

The projected actuarial required contributions (ARCs), if all assumptions are met, for the next five years are as follows: $21.3 million in 2019; $23.5 million in 2020; $25.3 million in 2021; $26.9 million in 2022 and 28.3 million in 2023.

Omaha School Employees Retirement System Summary

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	OPS RATES	UAL	**% OF ARC PAID
2018*									
2017	64%	7.5%	4.16%	13.0%.	N.A.	9.78%	9.878%	$771,000,000	100%
2016	65%	7.5%	-0.70%	13.07%	26.29%	9.78%	9.878%	$713,000,000	82.2%
2015	73%	8%	0.89%	11.96%	20.76%	9.78%	9.878%	$486,000,000	No ARC
2014	74%	8%	-4.01%	12.02%	20.23%	9.78%	9.878%	$446,000,000	No ARC

*Since the OSERS Plan is based on the calendar year ending December 31, the current plan year valuation report is not yet available.

**The percent of ARC paid as noted in the actuarial valuation reports includes contributions by the State of Nebraska of the statutorily required 2% of total compensation of all OSERS members. The following is a list of the contribution amounts contributed by the State of Nebraska to the OSERS Plan:

Year	Amount of State Contribution
2018	$7,110,567
2017	$6,896,530
2016	$6,660,783
2015	$6,452,650
2014	$6,285,320

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Summary Charts of 2014-2018
Actuarial and Investment Information

Douglas County Employees Plan

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	CNTY RATES	UAL	% OF ARC PAID
2018	68.0%	7.5%	16.8%	11.2%	18.0%	8.5%	8.5%	$148,540,000	94.4%
2017	67.2%	7.5%	6.8%	10.9%	17.5%	8.5%	8.5%	$140,285,000	104.7%
2016	67.3%	7.5%	2.3%	10.7%	15.8%	8.5%	8.5%	$133,784,248	110.8%
2015	66.8%	7.5%	5.2%	11.3%	16.5%	8.5%	8.5%	$131,057,379	111.8%
2014	64.6%	7.5%	18.9%	11.5%	17.0%	8.5%	8.5%	$134,897,663	104.3%

Eastern Nebraska Health Agency Plan

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	AGENCY RATES	UAL	% OF ARC PAID
2018	74%	7%	11.7%	74%	12.19%	2.75%	9.5%	$14,245,604	TBD
2017	N.A.	7%	6.8%	N.A.	11.55%	2.75%	9%	N.A.	108.7%
2016	71%	7%	6.8%	7.0%	11.55%	2.75%	8.5%	$13,710,422	106.9%
2015	N.A.	7%	0.2%	N.A.	10.77%	2.75%	8.0%	N.A.	108.3%
2014	76%	7%	15.6%	7.1%	10.77%	2.75%	7.5%	$ 9,981,149	102.2%

*Eastern Nebraska Human Services Agency Plan year ends December 31 so the current year Valuation Report is not yet available. Actuarial Valuations are conducted every other year.

Metro Area Transit Hourly Employees

YEAR	FUNDED RATIO	ASSUMED INVES RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	COUNTY RATES	UAL	% OF ARC PAID
2017	71%	6.75%	5.80%	7.39%	N.A.	6.0%	6.5%*	$11,424,110	N.A.
2016	72%	6.75%	-1.50%	7.35%	N.A.	6.0%	6.5%	$11,453,127	78.28%
2015	76%	7.0%	6.10%	7.39%	N.A.	6.0%	6.5%	$10,885,560	88.30%
2014	76%	7.0%	14.20%	7.28%	N.A.	6.0%	6.5%	$10,912,605	84.28%

*The employer made a one-time lump sum contribution to the Plan equal to 1% of the total of the active Plan participants' compensation for the period beginning on July 1, 2016 and ending on August 31, 2017, making the effective employer contribution rate 7.5% since July 1, 2016

Omaha Civilian Employees Plan

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	CITY RATES	UAL	% OF ARC PAID
2018	53%	7.5%	9.7%	9.72%	27.740%	10.075%	18.775%	$233,286,679	108.36%
2017	55%	8%	3.1%	9.843%	27.526%	10.075%	18.775%	$197,537,024	84.50%
2016	56%	8%	4.7%	9.881%	33.724%	10.075%	18.775%	$193,616,559	71.82%
2015	54%	8%	16%	13.231%	38.454%	10.075%	17.775%	$188,911,964	68%
2014	54%	8%	11%	13.231%	38.454%	10.075%	13.77%	$205,174,423	41.33%

The Omaha Civilian Employees Plan year is based on the calendar year.

Omaha Police and Fire Plan

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EMPLOYEE RATES	CITY RATES	UAL	% OF ARC PAID
2018	52%	7.75%	14.9%	22.21%	53.199%	15.35%-17.23%	32.97%-33.67%	$648,833,922	Pending
2017	52%	8%	15.0%	21.99%	50.212%	15.35%-17.23%	32.97%-33.67%	$611,737,378	101.8
2016	51%	8%	9.1%	22.14%	50.097%	15.35%-17.23%	32.97%-33.67%	$602,562,135	100.54%
2015	50%	8%	0.7%	22.191%	50.031%	16.195%	34.386%	$598,810,,636	96%
2014	47%	8%	4.9%	23.103%	52.138%	15.35%-17.23%	32.98 – 33.67%	$622,607,530	83%

Omaha Public Power District

YEAR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC %	EE RATES	DISTRICT RATES	UAL	% OF ARC PAID
2018*	N.A.	N.A	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2017	70.0%	7.0%	16.49%	12.1%	29.8%	6.7%	29.8%	$442,395,055	100%
2016	69.2%	7.0%	6.74%	11.1%	28.3%	6.2%	25.2%	$448,100,797	100%
2015	72.4%	7.75%	-1.07%	11.83%	25.2%	6.2%	17.53%	$433,114,517	100%
2014	73.9%	7.75%	3.85%	11.59%	23.73%	6.2%	21.11%	N.A.	100%

*Omaha Public Power District Plan year ends December 31 so the 2018 Valuation Report is not yet available.

Omaha School Employees Retirement System

AR	FUNDED RATIO	ASSUMED INVEST RATE	ACTUAL INVEST RETURN	NORMAL COST	TOTAL ARC%	EE RATES	OPS RATES	UAL	**% OF ARC PAID
2018*									
2017	64%	7.5%	4.16%	13.0%.	N.A.	9.78%	9.878%	$771,000,000	100%
2016	65%	7.5%	-0.70%	13.07%	26.29%	9.78%	9.878%	$713,000,000	82.2%
2015	73%	8%	0.89%	11.96%	20.76%	9.78%	9.878%	$486,000,000	No ARC
2014	74%	8%	-4.01%	12.02%	20.23%	9.78%	9.878%	$446,000,000	No ARC

*Since the OSERS Plan is based on the calendar year ending December 31, the current plan year valuation report is not yet available.

**The percent of ARC paid as noted in the actuarial valuation reports includes contributions by the State of Nebraska of the statutorily required 2% of total compensation of all OSERS members. The following is a list of the contribution amounts contributed by the State of Nebraska to the OSERS Plan:

Year	Amount of State Contribution
2018	$7,110,567
2017	$6,896,530
2016	$6,660,783
2015	$6,452,650
2014	$6,285,320

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Conclusion

In 2017 the Lincoln Police and Fire Plan reached a funding level of over 80% so the Plan was not required to complete the Reporting Action Plan and appear before the Nebraska Retirement Systems Committee in 2018. The Lincoln Police & Fire Plan was 66% in the first reporting year – 2014 – and made significant funding and benefit changes to reach its 80.9% funding level, which is considered to be a healthy plan funding level.

A number of the Plans recently conducted Experience Studies, which are now required under 13-2402(2) to be conducted at least every four years. As a result of new assumptions adopted, five of the seven plans reduced their assumed investment rate as follows: Metro Area Transit Hourly lowered to 6.75% from 7%; Omaha Civilian Employees and OSERS lowered to 7.5% from 8%; Omaha Police and Fire lowered to 7.75% from 8%; and OPPD lowered to 7.0% from 7.75%. The Douglas Employees Plan remained at 7.5% and the Eastern Nebraska Health Agency Plan remained at 7.0%.

According to the most recently reported investment returns only Metro Area Transit Hourly at 5.8% and OSERS at 4.16% reported earnings under the assumed rates. The remaining five plans achieved returns greater than the assumed rates: Douglas Employees Plan reported 16.8% return; Eastern Nebraska Health Agency reported 11.7%; Omaha Civilian Employees reported 9.7%; Omaha Police & Fire reported 15.0%; and OPPD reported 16.49%.

Funding levels remained generally unchanged and increased or decreased by a single percent. Omaha Police & Fire continues to have the lowest funding level at 52% followed by Omaha Civilian Employees at 53%, OSERS funding level is 64%, Douglas County is at 68%, OPPD is at 70%, Metro Area Transit Hourly funding level is 72% and Eastern Nebraska Health Agency is at 74%.

Payment of ARCs by various political subdivisions has in general improved. Eastern Nebraska Health Agency contributed 108.7% of its ARC. The City of Omaha contributed 108.36% of the Omaha Civilian Employees ARC and 101.81% of the Omaha Police & Fire ARC. OPPD again, as it has each year, contributed 100% of its ARC. OPS contributed 100% of the ARC for the OSERS Plan. Douglas County contributed 94.4% of its ARC and Metro Area Transit contributed 78.28% for the Metro Area Transit Hourly Plan.

The Committee will continue to monitor the funding progress of each plan and the political subdivisions' corrective actions to ensure a continued commitment to adequate funding.

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APPENDICES

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Appendix A

Douglas County Employees Retirement Plan Information

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2018 Pension Plan Reporting Form

1)

	2018	2017	2016	2015	2014
Funding Status	68.0%	67.2%	67.3%	66.8%	64.6%
Assumed Rate of Return	7.5%	7.5%	7.5%	7.5%	7.5%
Actual Investment Return - Actuarial	11.4%	6.2%	5.6%	9.0%	13.2%
Actual Investment Return - Market	16.8%	6.8%	2.3%	5.2%	18.9%
Member & Employer Contribution Rates	8.5%	8.5%	8.5%	8.5%	8.5%
Normal Cost	11.2%	10.9%	10.7%	11.3%	11.5%
Actuarial Required Contribution (ARC)	$23.1MM (18.0%)	$21.5MM (17.5%)	$19.4MM (16.4%)	$18.7MM (16.5%)	$18.8MM (17.0%)
ARC - Actual dollars contributed	$21.8MM (expected)	$22.5MM	$21.5MM	$20.9MM	$19.6MM
ARC - Percentage of ARC contributed	94.4% (expected)	104.7%	110.8%	111.8%	104.3%

2) See attached narrative.

3) In July 2015, the long-term disability benefit provision was removed from the Pension Plan and has been replaced by a separate fully-insured long-term disability plan. On January 1, 2016 the interest crediting rate on member contributions was changed from 5.0% to the 10-year treasury rate in effect on the 1st of November of the preceding plan year. The combined impact of these two changes was a $3.6 million decrease in the actuarial accrued liability and a 0.6% increase to the Plan's funded ratio.

In the January 1, 2017 Actuarial Valuation, the following actuarial assumptions were updated:

a) RP2000 Mortality Table with longer expected lives.
b) Amortization of unfunded liability was reduced from 30 years to 25 years.
c) Early retirement rates and rates of termination of employment were updated.

The net impact of these changes in actuarial assumptions was a 0.1% decrease to the funding status and $1.3 million increase to the Actuarially Required Contribution.

4) Based on actuarial projections, the Douglas County Pension Plan is projected to reach 100% funding status in the year 2040.

5) The amortization method is a 25-year amortization of the unfunded actuarial liability based on a closed, layered level percent of pay.

6) See attached narrative.

7) There are several ongoing negotiations with collective bargaining groups which represent County employees in which they are requesting the County institute a DROP program for their members. The adoption of a DROP program could impact funding of the County's pension plan. At this time, County management has not agreed to any of the proposals to institute a DROP program.

8) The March 2017 Actuarial Experience Analysis is attached.

9) The assumed rate of return of the plan is 7.5%. No changes have been made in the past year and none are contemplated in the near future.

10) The January 1, 2018 Actuarial Valuation Report is attached.

Douglas County, Nebraska
Analytical Report on Defined Benefit Pension Plan

The most recent actuarial valuation was performed by the Silverstone Group for the Douglas County Employees' Defined Benefit Pension Plan as of January 1, 2018. The report showed the plan was 68.0% funded, had net assets on an actuarial basis of $315.7 million, and had an unfunded actuarial accrued liability of $148.5 million. The plan had 3,666 participants and an equal member and employer contribution rate of 8.5% of pay. The normal cost was $14.4 million and the actuarial required contribution was $23.1 million. The funded ratio has increased from 67.2% on January 1, 2017.

To understand why the Douglas County DB Plan is only 68.0% funded, it is important to look at the recent history of changes to the Plan. In 1996, the Plan was 97.8% funded. In 1996 for law enforcement and in 1997 for all other plan participants, the following changes were made:

- Unreduced benefit upon Rule of 75.
- Benefit formula increased from 1.5% of pay per year of service to 2% of pay per year of service.

In 1998 a 3% COLA was approved, in 2000 a 4% COLA was approved, and in 2002 a 3% COLA was approved. By 2004, the funding ratio had fallen to 64.8%. The Plan is a contributory plan with the County's contribution equal to the Member's contribution. The County and Member contributions each increased from 5.5% of pay in 2005 to the present level of 8.5% of pay by 2008. Poor stock market performance during the Great Recession also negatively impacted the Plan's funded ratio which reached a low point of 57.8% in 2010.

The members of the Pension Committee and the County Board of Commissioners recognized that substantive changes had to be made to the Plan rules to ensure the financial viability of the Plan for its current participants. Accordingly, effective for all employees hired after December 31, 2011, the following pension provisions were put in place:

- No rule of 75.
- Benefit formula was reduced from 2% of pay per year of service to 1.5% of pay per year of service.
- Maximum retirement income was reduced from 60% of participant's final average compensation to 45%.

Sheriff Deputies (who account for about 10% of total plan participants) have slightly different plan provisions which provide for increased benefits with early retirement.

These plan changes, along with no COLA increases being given since 2002, have increased the plan funding ratio by 10.2 percentage points from its low point in 2010 to 68.0% as of January 1, 2018. These plan changes have also materially impacted the Plan's forecast of funded percentage so that the forecast now projects the plan achieving acceptable funded levels in the future as shown in the following forecast developed by Silverstone in January, 2018:

Estimated Funded Percentage*

2018	68.0%
2023	74.7%
2028	79.6%
2033	86.3%
2038	96.2%

Forecast based on current plan assumptions.

In July 2015, the Long-Term Disability (LTD) program was removed from the Pension Plan and put into a separate fully-insured benefit plan. On January 1, 2016 the interest crediting rate on member contributions was changed from 5.0% to the 10-year Treasury Rate in effect on November 1st of the preceding plan year. The combined impact of these two changes was a $3.6 million decrease in the actuarial accrued liability and a 0.6% increase to the Plan's funded ratio. On January 1, 2017, actuarial valuation updates were made to the mortality table, the amortization period of the unfunded liability was reduced, and the rates of early retirement and termination of employment were revised. The net impact of these changes was a 0.1% decrease to funding status and a $1.3 million increase to the Actuarially Required Contribution.

There are several ongoing negotiations with collective bargaining groups which represent County employees in which they are requesting the County institute a DROP program for their members. The adoption of a DROP program could impact funding of the County's pension plan. At this time, County management has not agreed to any of the proposals to institute a DROP program.

The Douglas County Pension Committee, Board of Commissioners, and administrative staff believe the aforementioned combination of actions will significantly improve the financial condition of the Douglas County Employee Defined Benefit Pension Plan and ensure the financial viability and payment of benefits to participants going forward.

April 20, 2018

PERSONAL & CONFIDENTIAL

Mr. Joe Lorenz
Budget & Finance Director
Douglas County Employees' Retirement Plan
1819 Farnam Street
Omaha, NE 68183

RE: 2018 Actuarial Valuation Report

Dear Joe:

Enclosed are 15 copies of the January 1, 2018 Actuarial Valuation Report for the
Douglas County Employees' Retirement Plan. The valuation was based on plan
provisions and assumptions consistent with those used in the January 1, 2017 valuation.

If you have any questions about the information provided in the report, please give me a call.

Sincerely,

Glen C. Gahan, FSA
Principal

GCG/cn

Enclosures

Wisdom at Work.

SilverStone GROUP

Welcome

Employees' Retirement Plan
Actuarial Review
as of January 1, 2018

April 26, 2018

Actuarial Valuation Overview

An actuarial valuation is performed annually to report on the financial health of the Retirement Plan, including:

- Funded Percentage
- Summary of Plan Liabilities and Assets
- Value of Earned Benefits
- Actuarially Determined Contribution
- Summary of County and Employee Contributions

Plan Provisions

- Monthly Annuity – the plan provides monthly benefits payable to the members and beneficiaries
- Amount of Benefit – determined by the member's pay, service and the plan's benefit formula. Pay is averaged over five years.
- Benefit Formula – depends on the member's date of hire and classification:
  - All prior to June 30, 2011
    - 2% of Average Pay times Years of Service
    - Maximum of 60% of Average Pay
    - Eligible for Rule of 75 Retirement
  - Generally, those hired after December 31, 2011
    - 1.5% of Average Pay times Years of Service
    - Maximum of 45% of Average Pay
    - Not eligible for Rule of 75
  - Sheriff deputies hired after June 30, 2011 have a service-graded benefit formula, with a maximum benefit of 60% of Average Pay
    - No Rule of 75
    - Unreduced benefit after 30 years of service

Plan Provisions (continued)

Full retirement benefits (unreduced) are payable:

	Hired Prior to 2012	Hired After 2011	Sheriff Deputies Hired After 2011
Normal Retirement Date	65	65	55
Rule of 75	50 with Age + Svc > 75	N/A	N/A

Early Retirement – a reduced pension payable after:

Hired Prior to 2012
- Age 55 with 20 years of service
- Age 60 with five years of service

Hired After 2012
- Age 50 with 10 years of service
- Age 60 with five years of service

Sheriff Deputies Hired After 2011
- Age 53

Other Benefits – may be payable upon death

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4

Plan Provisions (continued)

- Vesting Schedule – a deferred pension is earned based on the vesting schedule

Years of Service	Vesting Percentage
Less than 5	0%
5	25%
6	40%
7	55%
8	70%
9	85%
10 +	100%
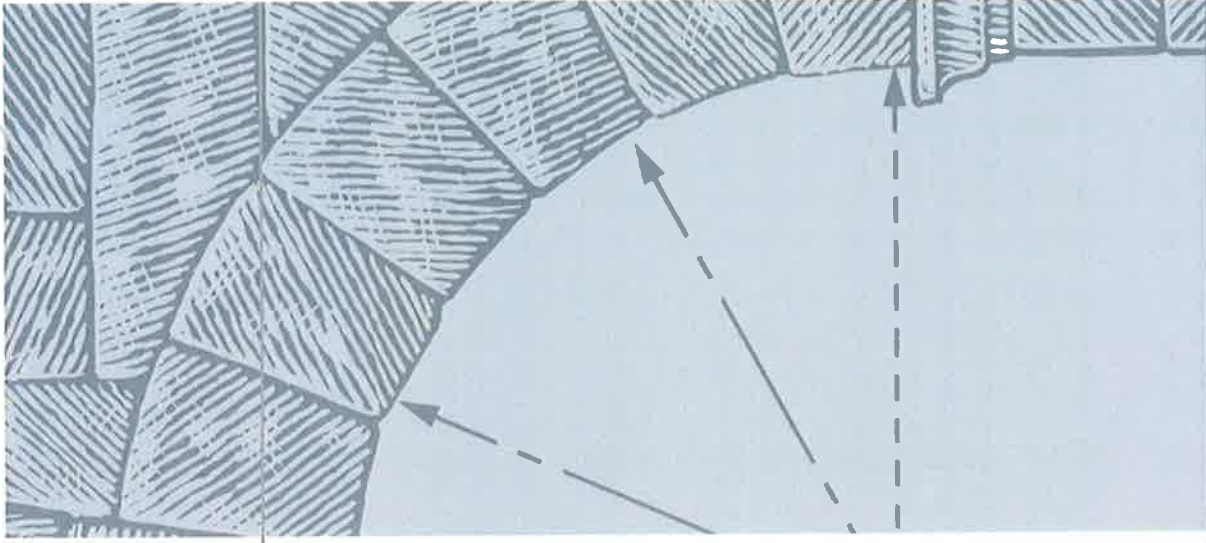
Plan Changes

- Disability Benefits – The disability provision for active members was removed from the Plan as of July 1, 2015. Disabilities occurring after this date are covered under an insurance contract separate from the pension plan.

- Interest on Member Contributions – Effective January 1, 2016, the interest crediting rate on Member Contributions was changed from 5.0% to the 10-year Treasury rate for the November preceding the Plan Year.
 - 2018   2.35%
  - 2017   2.14%
  - 2016   2.26%

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Plan Members

Number of Members	2017	2018
Actives	2,146	2,182
Retirees and Beneficiaries	1,218	1,259
Vested Terminated	119	106
Terminated Non-Vested	71	91
Disabled*	26	28
Total	**3,580**	**3,666**

Retirees and beneficiaries as a percent of total   34.0%   34.3%

* Disability benefits provided by an insurance contract held outside of the pension plan effective July 1, 2015.

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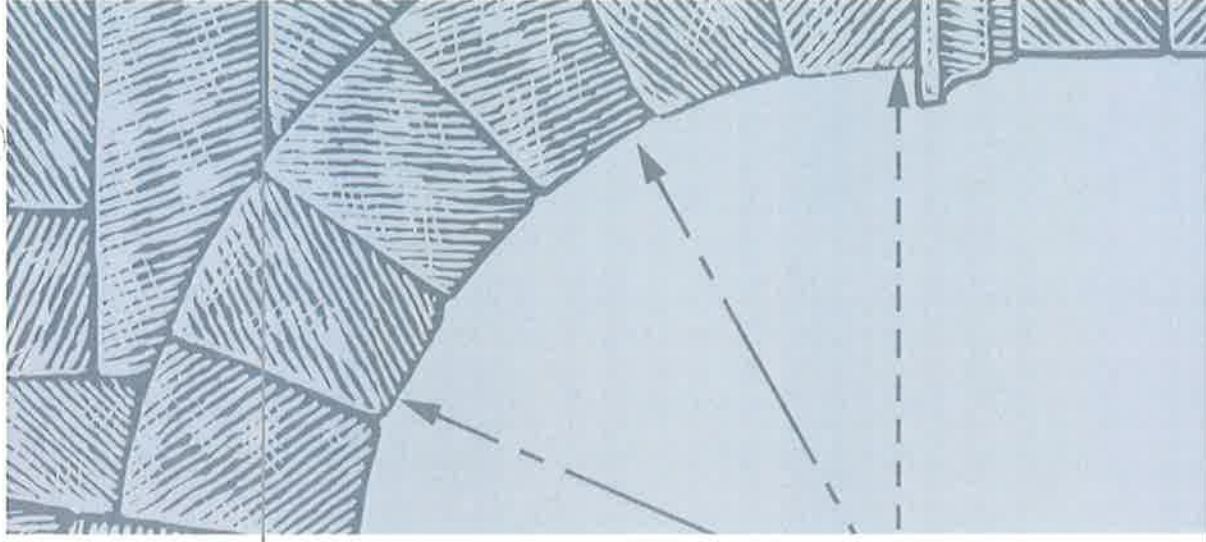
Actuarial Assumptions

Investment Return   7.5% per year

Salary Increases

Age	Annual Increase
18 – 44	5.5%
45 – 54	5.0%
55 +	4.5%

Mortality Table   RP 2000 projected to 2024 for Annuitants and 2032 for Non-Annuitants

Withdrawal Rates (Sample)

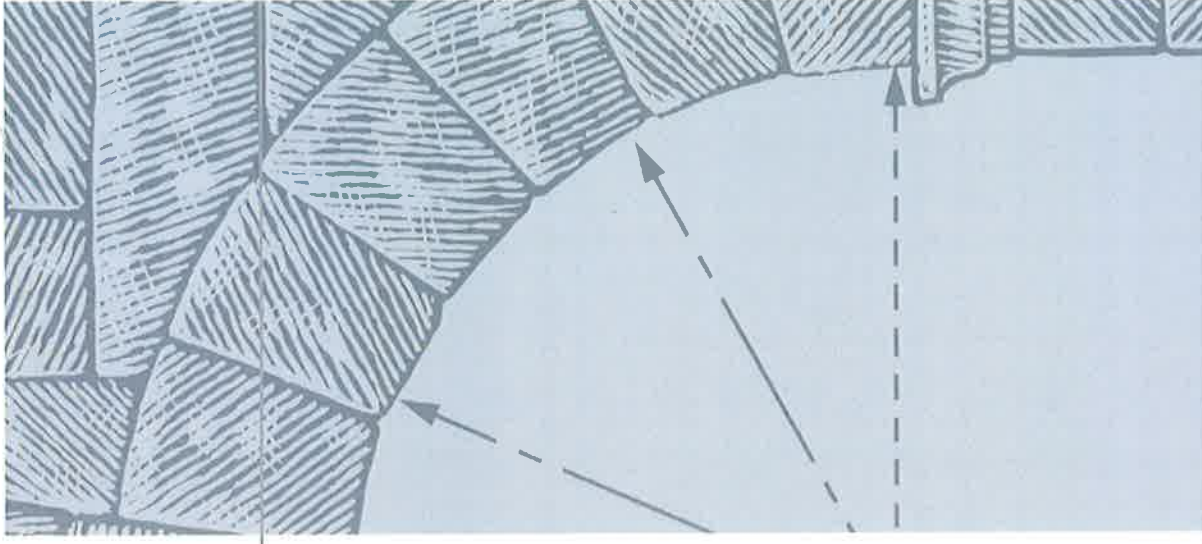| Age	Rate
22	28.3%
32	10.0%
42	5.9%
52	2.3%

- Member Contributions   8.5% of Pay
- County Contributions   Same amount as members

Actuarial Assumptions (continued)

Retirement Rates*

Age	Rule of 75	Other
50	30%	5%
51 – 54	5%	2%
55 – 61	10%	5%
62 – 64	20%	10%
65 – 69	30%	30%
70+	100%	100%

*30% assumed to retire upon eligibility for Rule of 75.

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Actuarial Assumptions (continued)

Retirement Rates* – Sheriffs hired after June 30, 2011:

Age	Rate
53 – 54	5%
55	25%
56 – 57	15%
58	20%
59 – 61	25%
62	30%
63	35%
64	40%
65+	100%

*100% assumed to retire at 30 years of service
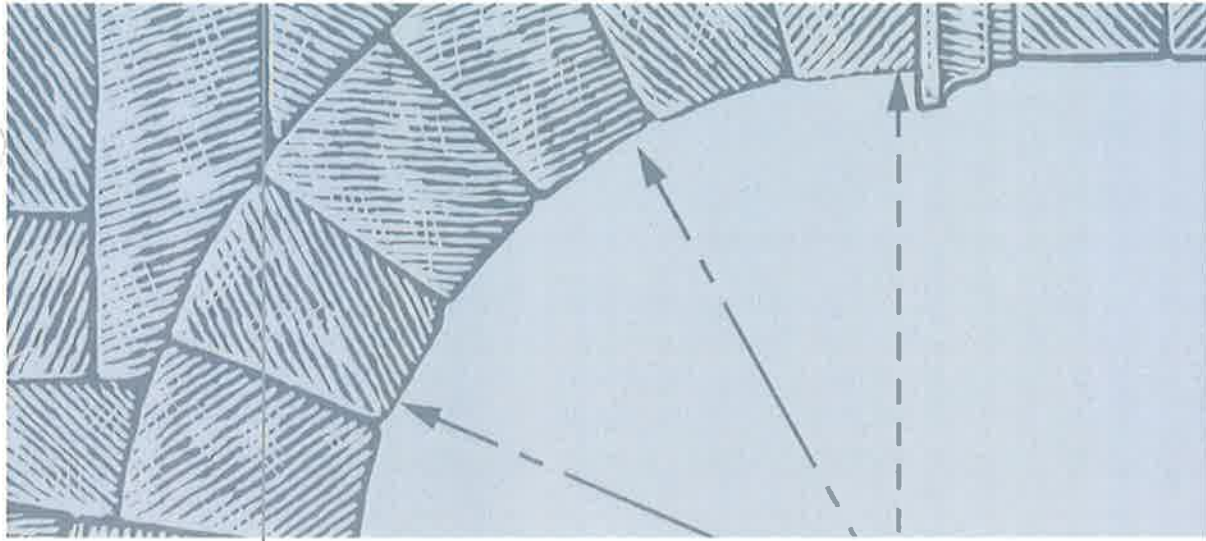
Actuarial Measurements (thousands)

	2017	2018
Actuarial Accrued Liability	$427,763	$464,234
Actuarial Value of Assets	$287,478	$315,694
Funded Percentage	67.2%	68.0%
Unfunded Liability	$140,285	$148,540
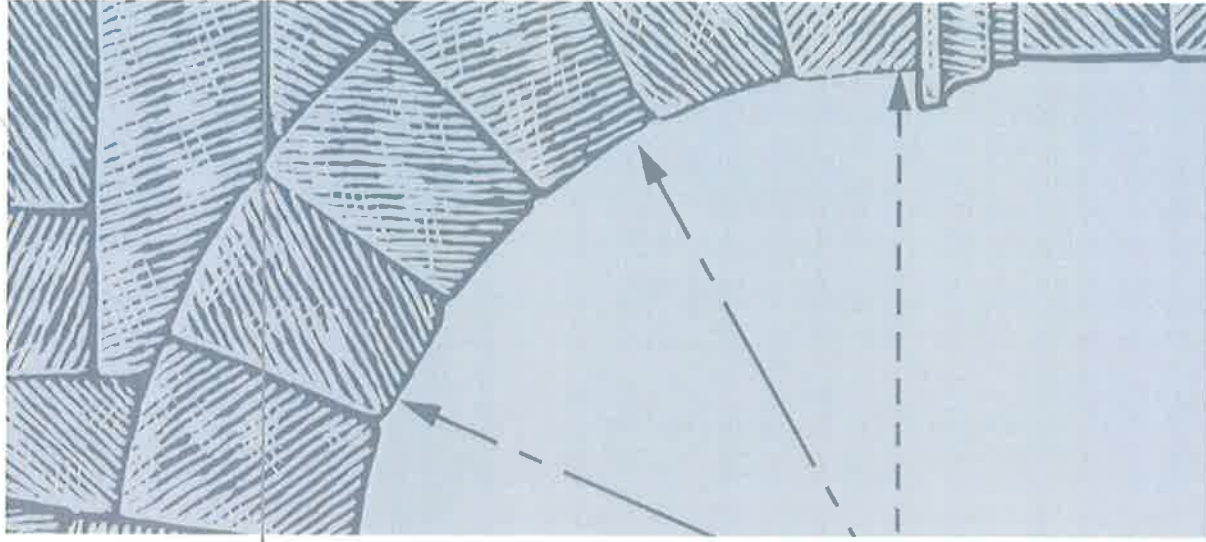
Actuarial Determined Contribution

	2017	2018
Expected Member Contributions	$10,476	$10,923
Expected County Contributions	$10,476	$10,922
Total	**$20,952***	**$21,845**
Actuarial Determined Contribution		
▪ Normal Cost (Value Of Benefits Earned In The Year)	$13,486	$14,372
▪ 25-Year Amortization of Unfunded Liability	$7,261	$7,927
▪ ½ year interest	$778	$836
Total	**$21,525**	**$23,135**

*Actual total for 2017 was $22,525,334

Plan Asset History

Year	Market Value of Assets	Rate of Return Prior Year
2018	$326,905,394	16.8%
2017	$283,902,001	6.8%
2016	$269,520,264	2.3%
2015	$267,549,482	5.2%
2014	$258,340,593	18.9%
2013	$219,605,063	10.3%
2012	$200,860,360	0.5%
2011	$199,988,291	11.0%
2010	$179,166,378	16.0%
2009	$151,275,593	-18.7%
2008	$184,386,700	4.9%
2007	$175,115,759	12.1%
2006	$157,653,656	7.1%
2005	$148,916,100	10.0%
2004	$137,080,947	15.7%

15-year geometric average return of 7.4%
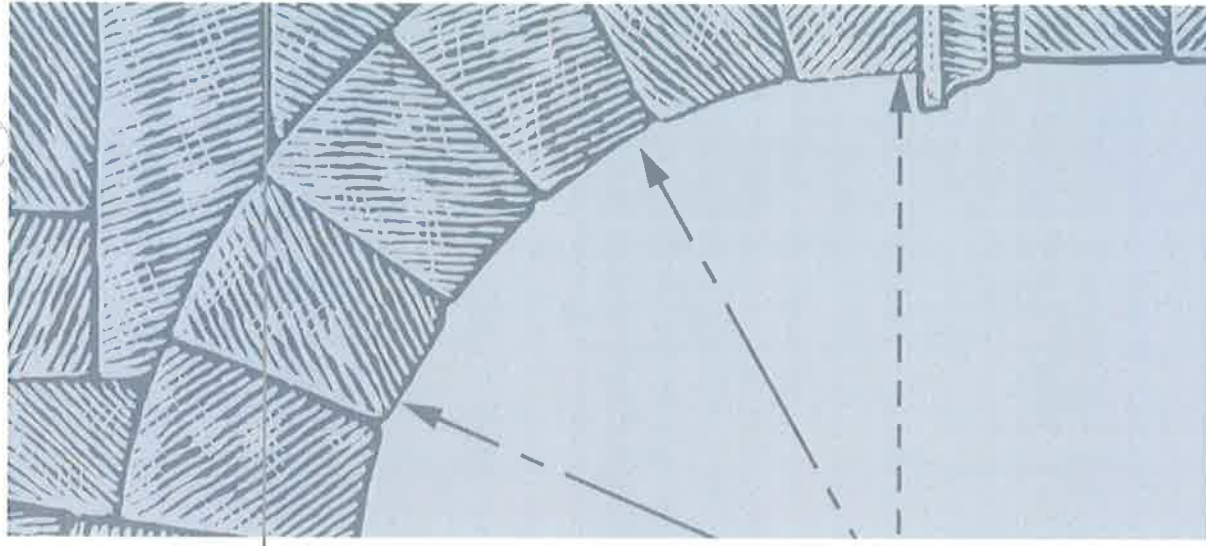
Historical Funded Percentage

Year	Actuarial Value of Assets ($1,000s)	Actuarial Accrued Liability ($1,000s)	Funded Ratio
2018	$315,694	$464,234	68.0%
2017	$287,478	$427,763	67.2%
2016	$274,878	$408,662	67.3%
2015	$263,790	$394,847	66.8%
2014	$245,830	$380,727	64.6%
2013	$219,494	$362,117	60.6%
2012	$205,795	$343,178	60.0%
2011	$196,119	$321,700	61.0%
2010	$177,797	$307,407	57.8%
2005	$142,403	$221,642	64.2%
2000	$117,626	$127,011	92.6%
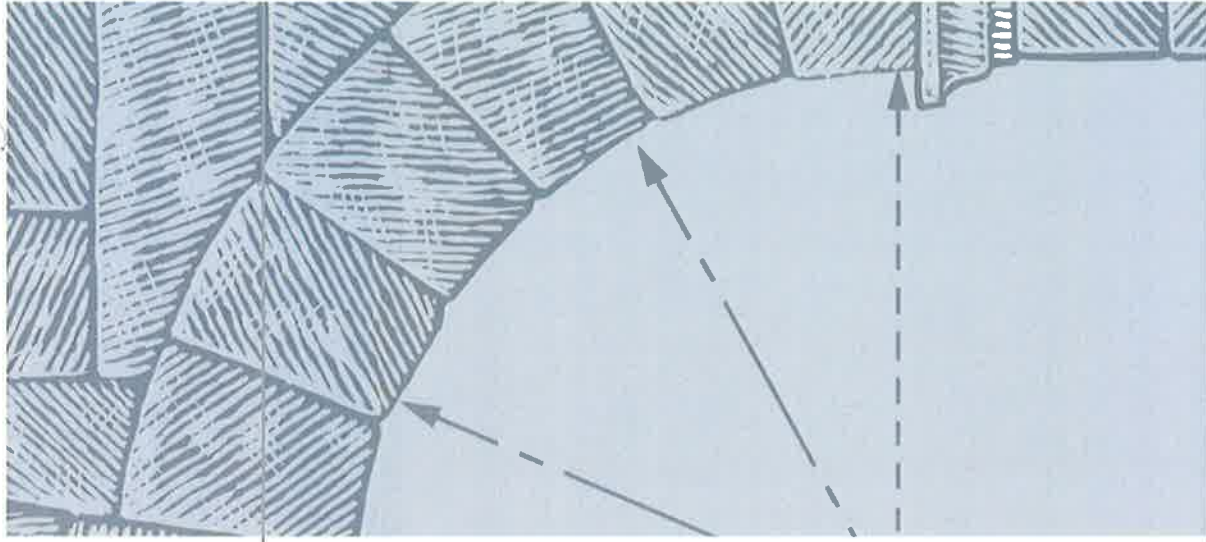
Looking Forward

- Funding Policy
- Mortality Table Update
- Reporting of Risk Measures
- Forecasts of Funding Percentage

Funding Policy

The County's funding policy is to contribute amounts to the plan necessary to fund benefits earned under the plan, along with members' contributions, based on the Contribution Rates below.

Nebraska State statue limits the County's contribution to no more than the amounts contributed by the members.

Member Contributions   8.5% of Pay

- For all members, regardless of date of hire or classification
 – Except for sheriff deputies, reduced at 33 years of service

County Contributions   Same Amount as Members
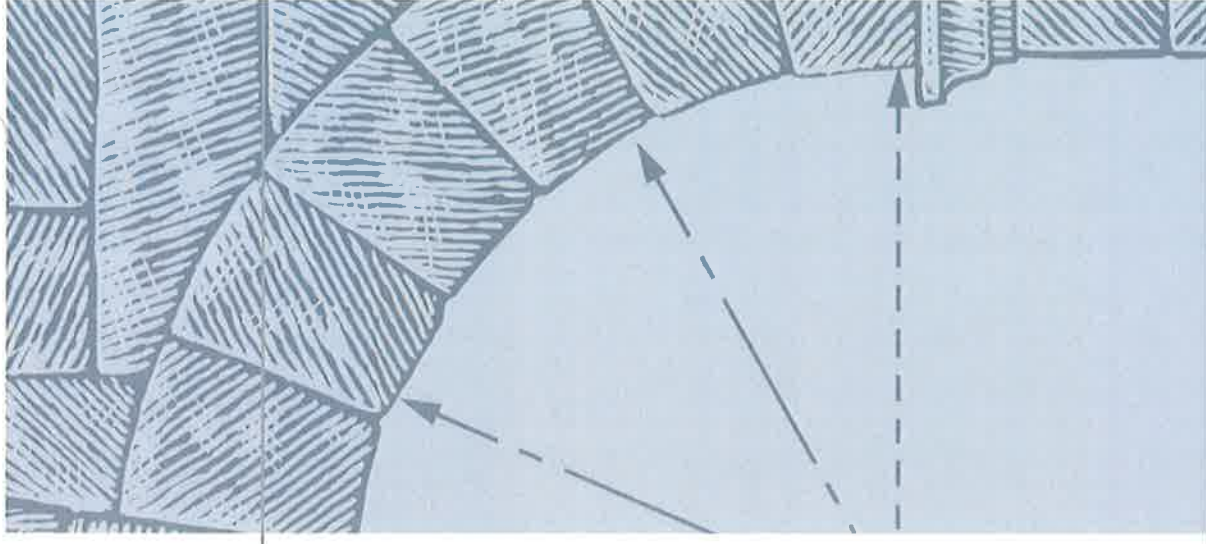
Mortality Table Update

There is a new public pension plan mortality table expected to be published by the Society of Actuaries later in 2018. The RP-2000 mortality table is used now, which is a commonly used table.

Once available, we expect the new public pension mortality table will be analyzed and recommended. We also expect this table to include a generational mortality improvement scale. Early indications are the new table will predict longer life expectancies and result in an increase in plan liabilities and costs.
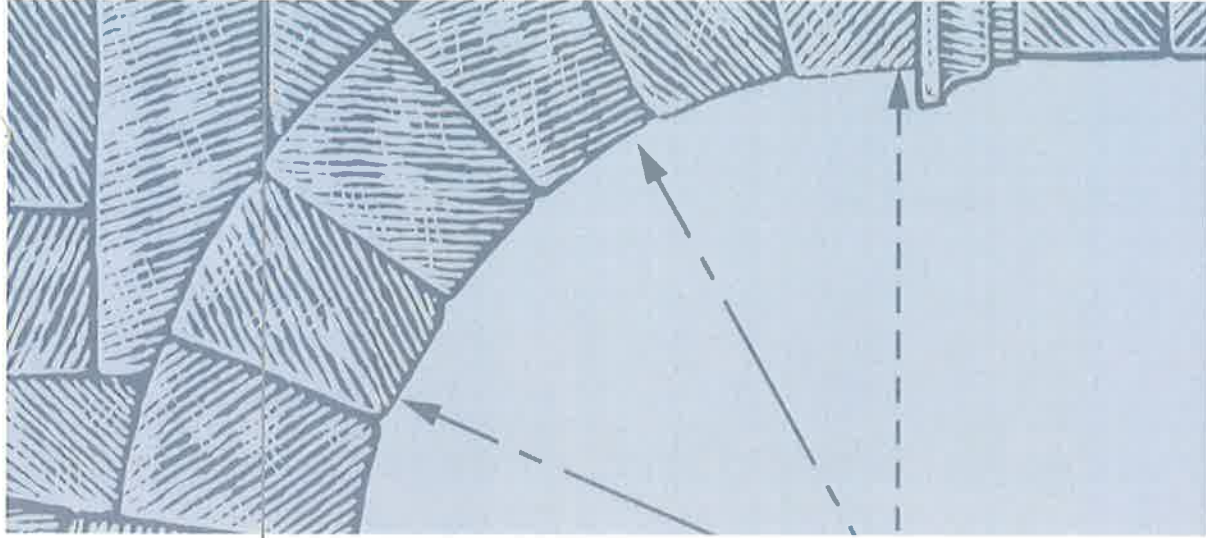
Risk Measures

- The Actuarial Standards of Practice are requiring the addition of certain risk disclosures.

- Risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

- Sample sources of risk include:
  - Investment Return
  - Asset/Liability Mismatch
  - Interest Rate Risk
  - Longevity and Other Demographic Risks
  - Contribution Risk

Risk Measures (continued)

	January 1, 2018
Market Value of Assets	$326,905,394
Participant Payroll	$124,582,198
Ratio	2.6

More risk is associated with plans whose size (assets and liabilities) are significantly larger than annual payroll.

Market Value of Assets	$326,905,394
Actuarial Accrued Liability	$464,233,774
Ratio	70.4%

More risk is associated with plans that have lower funded ratios.

Retired Participant Liability	$240,332,061
Total Actuarial Accrued Liability	$464,233,774
Ratio	51.8%

More risk is associated with plans whose retiree liability is a significant and growing proportion of the plan's total liability.

2017 Benefit Payments	$26,057,732
2017 Total Contributions	$22,525,334
Ratio	115.7%

More risk is associated with plans whose benefit payments are significantly larger than contributions.

Forecast of Funded Percentage

Forecast Period	Year	Estimated Funded Percentage		
		8.5 % Investment Return	7.5% Investment Return	6.5% Investment Return
Current – Actual	2018	68.0%	68.0%	68.0%
5 Years	2023	77.7%	74.7%	71.8%
10 Years	2028	87.5%	79.6%	72.4%
15 Years	2033	100.9%	86.3%	73.4%
20 Years	2038	120.4%	96.2%	76.1%

Assumptions

Investment Return	7.5%, 6.5% or 8.5%
Salary Scale	Graded 8.5% or 4.5% – 5.5%
Mortality Table	RP2000 Projected to 2024 for Annuitants and 2032 for Non-Annuitants
Actuarial Cost Method	Projected Unit Credit
Member Growth Rate	0%
Plan Provisions	Same as Current
Other Assumptions	Consistent with Valuation

Forecasts are intended for illustrative purposes as an indication of future trends and risks. Actual future funded percentages will differ from these forecasts as actual plan experience differs from the assumptions.

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Thank you!

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DOUGLAS COUNTY EMPLOYEES' RETIREMENT PLAN

Actuarial Valuation Report

January 1, 2018

SilverStone
GROUP

April 20, 2018

ACTUARIAL CERTIFICATION

Employees' Retirement Committee
Douglas County Employees' Retirement Plan
1819 Farnam Street
Omaha, NE 68183

Committee Members:

An actuarial valuation was performed for the Douglas County Employees' Retirement Plan as of January 1, 2018. The valuation was prepared to determine the value of accrued benefits and annual costs. The results of the valuation are contained in the accompanying report.

The valuation is based on eligible employees and the summary of assets submitted by Douglas County, and data concerning retired employees submitted by United of Omaha. Summaries of the data and the calculations contained in the valuation were performed by our firm from this data.

To the best of my knowledge, the information supplied in this report is complete and accurate and, in my opinion, the assumptions are reasonably related to the experience of the plan and to reasonable expectations and represent my best estimate of anticipated experience under the Plan. The undersigned meets the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Sincerely,

Glen C. Gahan, FSA
Principal
Member of American Academy of Actuaries
Enrolled Actuary No. 17-04875

GCG/cn

Enclosure

Table of Contents

Definition of Terms

This section of the report provides a brief description of terms used throughout this report.

Annual Contributions: Anticipated Member Contributions is equal to 8.50% of the covered payroll (Sheriff members contribute less after 32 years of service). County Contributions are equal to the Anticipated Member Contributions.

Actuarially Determined Contribution: Consists of the annual normal cost plus an amount equal to the 25-year amortization as a level percent of pay of the unfunded actuarial accrued liability, on a closed, layered basis.

Market Value of Plan Assets: Plan assets are amounts that have accumulated and will be used to meet future benefit obligations. In this exhibit, trust fund transactions reported by the trustee are traced from the prior valuation date to the current valuation date.

Actuarial Value of Plan Assets: Plan assets calculated with expected interest and adjusted by one half of the excess of the Market Value over the preliminary Actuarial Value.

Actuarial Accrued Liability: The actuarial accrued liability is equal to the sum of individual accrued liabilities for all participants. Each participant's accrued liability equals the actuarial present value of all future benefits less the present value of all future normal costs.

Unfunded Actuarial Accrued Liability: The unfunded actuarial accrued liability on the valuation date is equal to the excess of the Plan's actuarial accrued liability over the Plan's actuarial value of assets.

Annual Normal Cost: The annual normal cost is the portion of total Plan costs assigned to the current plan year by the actuarial cost method.

Financial Highlights

This section displays a summary of the results of the actuarial valuations performed for the 2016, 2017 and 2018 plan years. Additional supporting detail and history is available in other sections of the report.

| | Plan Year Beginning January 1 | | |
	2016	2017	2018
Annual Contributions			
Anticipated Member Contributions	$10,029,713	$10,476,275	$10,922,473
County Contributions	10,029,713	10,476,275	10,922,473
Actual Total Contributions	$21,520,522	$22,525,334	N/A
Actuarially Determined Contribution	$18,697,387	$21,525,345	$23,134,997
Value of Plan Assets			
Market Value	269,935,429	283,902,001	326,905,394
(Rate of Return)	2.3%	6.8%	16.8%
Actuarial Value	274,877,630	287,477,661	315,694,446
(Rate of Return)	5.6%	6.2%	11.4%
Actuarial Accrued Liability	408,661,878	427,763,448	464,233,774
(Funded Ratio)[1]	67.3%	67.2%	68.0%
Annual Covered Payroll	117,996,629	123,250,290	128,499,679
Annual Normal Cost	12,627,155	13,486,236	14,371,624
(As a percent of covered payroll)	10.7%	10.9%	11.2%
Number of Participants			
Active	2,122	2,146	2,182
Retirees and Beneficiaries	1,206	1,218	1,259
Vested Terminated	119	119	106
Terminated Non-Vested	46	71	91
Disabled Participants	25	26	28
Total	3,518	3,580	3,666

[1]Funded Ratio - Expressed as the ratio of Actuarial Value of Assets to Actuarial Accrued Liability.

Comments on the Valuation

Covered Employees

Ages of Active Participants - The average age of active participants included in the valuation decreased from 45.2 for the prior year to 45.1 for the current year.

Covered Payroll and Participants - Total covered payroll increased from $125,734,253 to 130,901,112, a 4.1% increase. The number of active participants increased from 2,146 in 2017 to 2,182 in 2018.

Average Annual Compensation - The average covered compensation of active participants increased at a rate of 2.4% per year compared to an assumed annual salary increase assumption of 5.5% between ages 18-44, 5.0% between 45-54, and 4.5% for ages 55 and greater. The average covered compensation of all active participants was $58,590 for 2017 and $59,991 for 2018.

Investment Return

The plan's investment return was higher than the assumed rate. The approximate annual investment return was 11.4% on the actuarial value of assets for the 2017 plan year, compared to a 7.5% assumption.

Actuarial Assumptions and Methods

The actuarial methods and assumptions are consistent with those used in the 2017 valuation except for a change in the interest crediting rate on employee contributions from 2.14% to 2.35%. This rate is indexed to the 10-year Treasury rate for the November preceding the plan year. The actuarial methods and assumptions are described on pages 20-22 of the Report.

Plan Provisions

The plan provisions are consistent with those used in the 2017 valuation.

Market Value of Plan Assets

Summary of Changes in Value of Plan Assets

Market Value of Plan Assets on January 1, 2017		$283,902,001

Plus Increases

Employee Contributions	11,262,246	
County Contributions	11,263,088	
Investment Experience	47,393,742	
		69,919,076

Less Decreases

Pensions Paid to Retirees	24,035,334	
Refunds to Terminated EEs	2,022,398	
Disability Premiums/Administration	0	
Administrative Expenses	857,951	
		26,915,683

Market Value of Plan Assets on January 1, 2018		$326,905,394
Approximate Rate of Return		16.8%

Plan Investments	% of Total	Market Value
US Bank		
Operating Account - Cash and Cash Equivalents	0.6%	$1,955,952
Deposit in Transit	0.0%	0
Atlanta Capital	11.0%	35,856,839
State Street - Fixed Income Portfolio	2.6%	8,434,807
JP Morgan	4.2%	13,822,038
Winslow - Capital Management	4.2%	13,878,611
Sanderson International	3.8%	12,560,197
Harding Loevner	5.9%	19,279,987
Aristotle	3.7%	12,068,001
Wells Cap Emerging	6.2%	20,180,754
Macquarie	9.4%	30,860,694
Total		168,897,880
United of Omaha Insurance Company		
Retired Contract #6148 - Annuity Program	21.2%	69,483,109
Retired Contract #12795 - Annuity Program	1.6%	5,081,602
Small Company Fund	4.0%	12,951,687
Institutional Index 500	21.6%	70,491,116
Total		158,007,514
Grand Total	100.0%	$326,905,394

Actuarial Value of Plan Assets

Actuarial Value of Plan Assets on January 1, 2017 $287,477,661

Plus Increases

Employee Contributions	11,262,246	
County Contributions	11,263,088	
Expected Interest	21,396,186	
		43,921,520

Less Decreases

Pensions Paid to Retirees	24,035,334	
Refunds to Terminated EEs	2,022,398	
Disability Premiums/Administration	0	
Administrative Expenses	857,951	
		26,915,683

Adjusted Value on January 1, 2018   304,483,498

Market Value on January 1, 2018   326,905,394

One-Half Excess, Market Value Less Adjusted Value   11,210,948

Actuarial Value of Plan Assets on January 1, 2018 $315,694,446

Approximate Rate of Return   11.4%

Actuarial Value as a % of Market Value   96.6%

Valuation Results

	Plan Year Beginning January 1		
	2016	**2017**	**2018**
Actuarial Accrued Liability			
1. Active	$185,550,116	$192,189,205	$213,480,553
2. Vested Terminated Participants	6,159,172	6,570,956	6,471,917
3. Terminated Non-Vested*	338,263	456,760	1,317,806
4. Disabled Participants	2,580,079	2,813,303	2,631,437
5. Retirees	214,034,248	225,733,224	240,332,061
6. Total (1) + (2) + (3) + (4) + (5)	408,661,878	427,763,448	464,233,774
Unfunded Actuarial Accrued Liability			
1. Actuarial Accrued Liability	408,661,878	427,763,448	464,233,774
2. Actuarial Value of Plan Assets	274,877,630	287,477,661	315,694,446
3. Unfunded Accrued Liability (1) - (2)	133,784,248	140,285,787	148,539,328
4. Ratio of Assets to Accrued Benefits (2) / (1)	67.3%	67.2%	68.0%
Annual Normal Cost			
• Retirement, Death, Termination and Disability	11,817,349	12,634,530	13,390,908
• Immediate Disability Benefit	0	0	0
• Annual Administrative Expense	809,806	851,706	980,716
Total	12,627,155	13,486,236	14,371,624

* Amount equal to expected refund of member contributions.

Actuarially Determined Contribution

The Members contribute 8.5% of covered payroll annually to the Plan, with Sheriff members hired after July 1, 2011 contributing less after 32 years of service. The County contributes an annual amount equal to the Member contributions.

An actuarially determined contribution is the annual calculated contribution amount as determined by application of the plan's actuarial methods and assumptions. This contribution provides a measure of the amount of contributions needed to fund the benefits earned in the current year plus the 25-year amortization of the unfunded accrued liability, based on a closed, layered level percent of pay. It is an illustrative amount useful as a benchmark comparison to the actual contributions into the plan and is also reported in the annual Governmental Accounting Standards Board (GASB) disclosures. The plan is not currently being funded on this basis, but is funded by the fixed contribution rates described above.

	Plan Year Beginning January 1		
	2016	**2017**	**2018**
Annual Normal Cost	$12,627,155	$13,486,236	$14,371,624
Amortization of the Unfunded Accrued Liability	6,070,232	7,261,084	7,927,168
Interest	N/A	778,025	836,205
Actuarially Determined Contribution	18,697,387	21,525,345	23,134,997

Actuarial Methodology

Actuarial Cost Method	Projected Unit Credit	Projected Unit Credit	Projected Unit Credit
Amortization Method	Level Percent of Pay	Level Percent of Pay	Level Percent of Pay
Amortization Period	30 Years, Open Period	25 Years, Close Period	25 Years, Close Period
Actuarial Assumptions	Same, as described in report	Same, as described in report	Same, as described in report
Actual Contributions	$21,520,522	$22,525,334	N/A

Amortization of Unfunded Accrued Liability

The annual contribution rate to the Employees' Retirement Plan increased from 5.5% of reported earnings to 6.5% in 2006, 7.5% in 2007 and 8.5% in 2008 and thereafter for both Members and the County. Contributions for Members of the Sheriffs department hired after July 1, 2011 will decrease after 32 years of service.

As valued as of January 1, 2018, the Accrued Liability exceeds the Actuarial Value of Plan Assets by $148,539,328. The amount of expected annual contributions exceeds the Annual Normal Cost by $7,473,322. Favorable plan experience following the valuation date will reduce the UAL. Unfavorable plan experience will increase the UAL.

	Plan Year Beginning January 1		
	2016	2017	2018
Plan Contributions			
Anticipated Member Contributions	$10,029,713	$10,476,275	$10,922,473
Anticipated County Contributions	10,029,713	10,476,275	10,922,473
Contribution Available to Reduce UAL			
Total County and Member Contributions	20,059,426	20,952,550	21,844,946
Annual Normal Cost	12,627,155	13,486,236	14,371,624
Amount Available to Reduce UAL	7,432,271	7,466,314	7,473,322
Unfunded Accrued Liability	133,784,248	140,285,787	148,539,328
Years Required to Amortize the UAL			
• as a level percent of pay	22.8	24.1	26.0
• as a level dollar amount	Unable to Amortize	Unable to Amortize	Unable to Amortize

Accrued Liability Payments

One of the components included to determine the actuarially determined contribution is the Accrued Liability Payment. The Accrued Liability Payment is an annual amount that will amortize:

- The unfunded accrued liability established as of January 1, 2017.
- An increase or decrease in the unfunded accrued liability due to plan amendment.
- An increase or decrease in the unfunded accrued liability due to a change in actuarial assumptions.
- An increase or decrease in the unfunded accrued liability resulting from actuarial gains or losses due to plan experience more or less favorable than expected.

This section of the report documents the Amortization Bases established for the Plan and displays other values associated with minimum funding.

Amortization Base	Date Established	Source of Base
140,285,787	January 1, 2017	Initial Unfunded
5,714,314	January 1, 2018	Actuarial Loss

Minimum Funding

The Unamortized Balance is based on the methodolgy for the actuarially determined contribution and does not reflect actual past funding of the Amortization Bases. For each amortization base, the initial amortization period and the remaining term of the amortization period determined on the valuation date are displayed.

Charge Bases

Amortization Base	Initial Term-Years	Remaining Term on Valuation Date	Minimum Payment
140,285,787	25	24	7,631,400
5,714,314	25	25	295,768
		Total $	7,927,168

Credit Bases

Amortization Base	Initial Term-Years	Remaining Term on Valuation Date	Minimum Payment
0	0	0	0
		Total $	-

Total		$	7,927,168

Risk Disclosures

Recent revisions to certain actuarial standards of practice introduced new disclosure requirements, such as describing the funded status of the plan on the basis of the market value of assets. In addition, the Actuarial Standards Board has issued a new actuarial standard of practice on risk disclosure. Common measures of risk include the ratio of market value of assets and actuarial accrued liability to participating payroll.

Risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience. Sample sources of risk include: Investment Return, Asset/Liability Mismatch, Interest Rate Risk, Longevity and Other Demographic Risks and Contribution Risk.

	January 1, 2018
Market Value of Assets	$326,905,394
Participant Payroll	128,499,679
Ratio	2.5
Actuarial Accrued Liability	464,233,774
Participant Payroll	128,499,679
Ratio	3.6

More risk is associated with plans whose size (assets and liabilities) are significantly larger than annual payroll.

Retired Participant Liability	240,332,061
Total Actuarial Accrued Liability	464,233,774
Ratio	51.8%

More risk is associated with plans whose retiree liability is a significant and growing proportion of the plan's total liability.

2017 Benefit Payments	26,057,732
2017 Total Contributions	22,525,334
Ratio	115.7%

More risk is associated with plans whose benefit payments are significantly larger than contributions.

Market Value of Assets	326,905,394
Actuarial Accrued Liability	464,233,774
Ratio	70.4%

Summary of Historical Valuation Results

Annual Normal Cost

Year	Annual Normal Cost
2014	$12,698,811
2015	$12,756,226
2016	$12,627,155
2017	$13,486,236
2018	$14,371,624

Annual Normal Cost as a Percentage of Covered Payroll

Year	Percentage
2014	11.5%
2015	11.3%
2016	10.7%
2017	10.9%
2018	11.2%
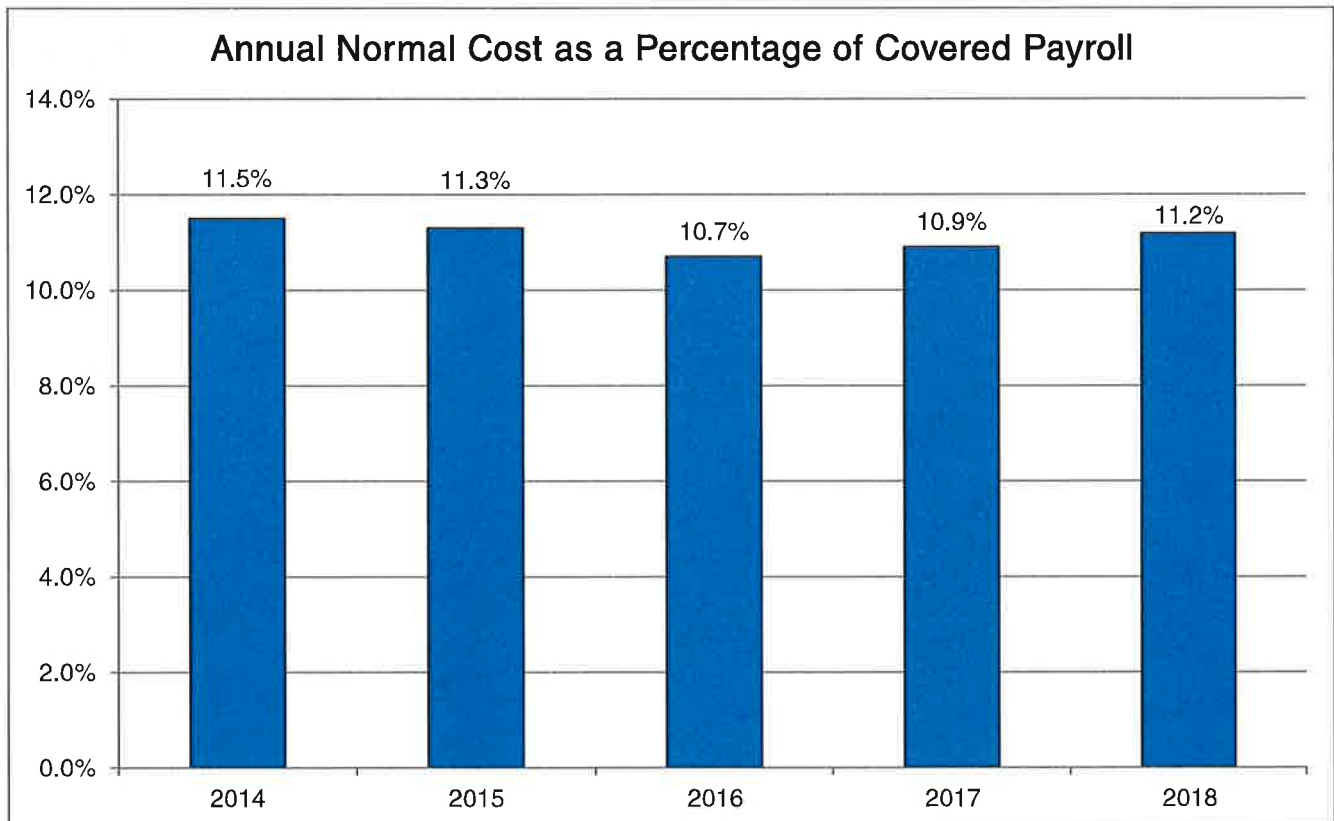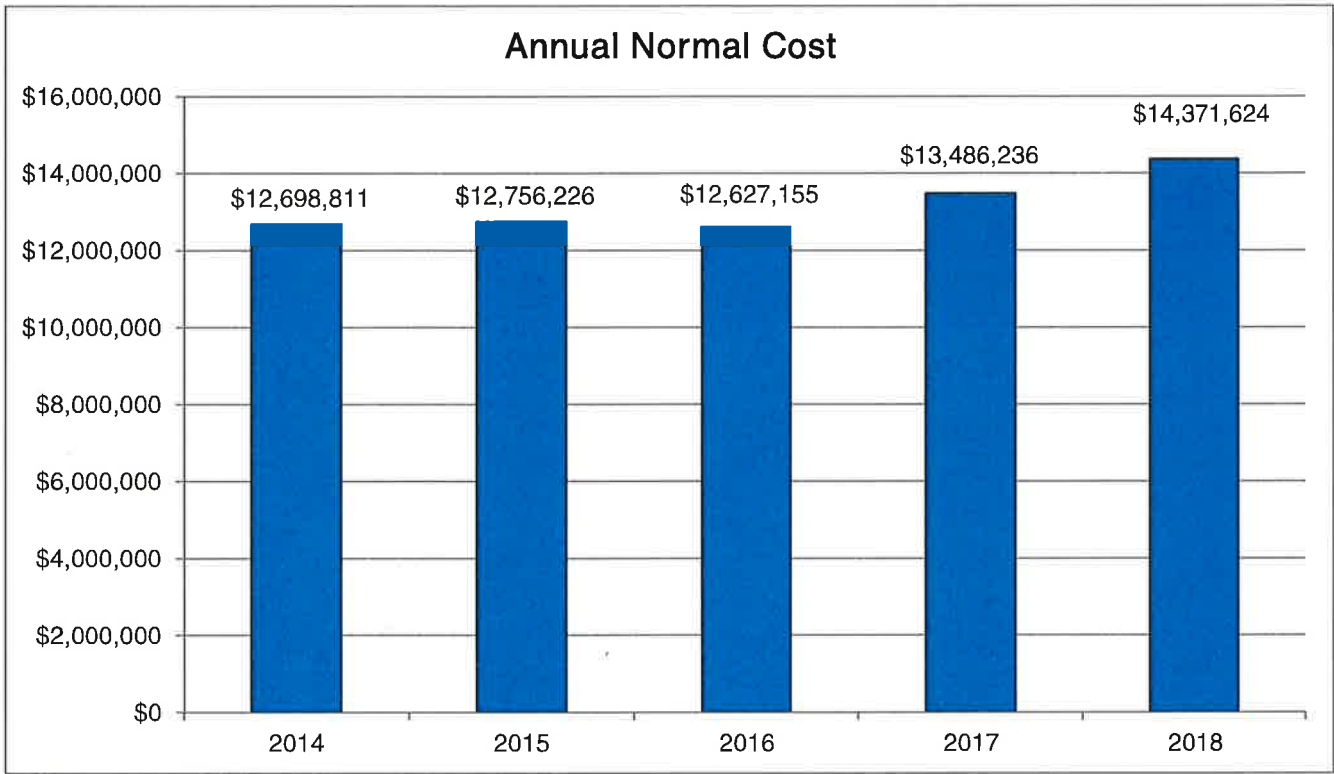
Summary of Historical Valuation Results

(continued)

Year	Annual Return on Market Value of Assets	Annual Return on Actuarial Value of Assets
2017	16.8%	11.4%
2016	6.8%	6.2%
2015	2.3%	5.6%
2014	5.2%	9.0%
2013	18.9%	13.2%
2012	10.3%	7.6%
2011	0.5%	5.0%
2010	11.0%	9.7%
2009	16.0%	3.8%
2008	-18.7%	-6.4%
2007	4.9%	7.2%
2006	12.1%	10.0%
2005	7.1%	7.8%
2004	10.0%	8.7%
2003	15.7%	7.3%
2002	-4.6%	0.0%
2001	1.3%	2.4%
2000	2.3%	6.2%
1999	7.3%	N/A
1998	7.7%	N/A
1997	13.3%	N/A
1996	10.6%	N/A
1995	17.2%	N/A
1994	2.4%	N/A
1993	10.4%	N/A
1992	7.9%	N/A
1991	15.5%	N/A
1990	6.7%	N/A
1989	15.5%	N/A
1988	11.5%	N/A
1987	4.4%	N/A
1986	15.5%	N/A
1985	20.6%	N/A
1984	8.9%	N/A
Average	6.6% (18 yrs) 8.6% (34 yrs)	6.4% (18 yrs)

The Plan's Asset Method was changed to Actuarial Value in 2000. The annual return on the Actuarial Value of Assets was not calculated prior to this change.

(continued)

Market and Actuarial Value of Assets

	2014	2015	2016	2017	2018
MVA	$258,340,593	$267,549,482	$269,935,429	$283,902,001	$326,905,394
AVA	$245,830,308	$263,789,654	$274,877,630	$287,477,661	$315,694,446

Actuarial Accrued Liability vs. Actuarial Value of Assets

	2014	2015	2016	2017	2018
AAL	$380,727,308	$394,847,033	$408,661,878	$427,763,448	$464,233,774
AVA	$245,830,308	$263,789,654	$274,877,630	$287,477,661	$315,694,446

Funded Ratio

2014	2015	2016	2017	2018
64.6%	66.8%	67.3%	67.2%	68.0%
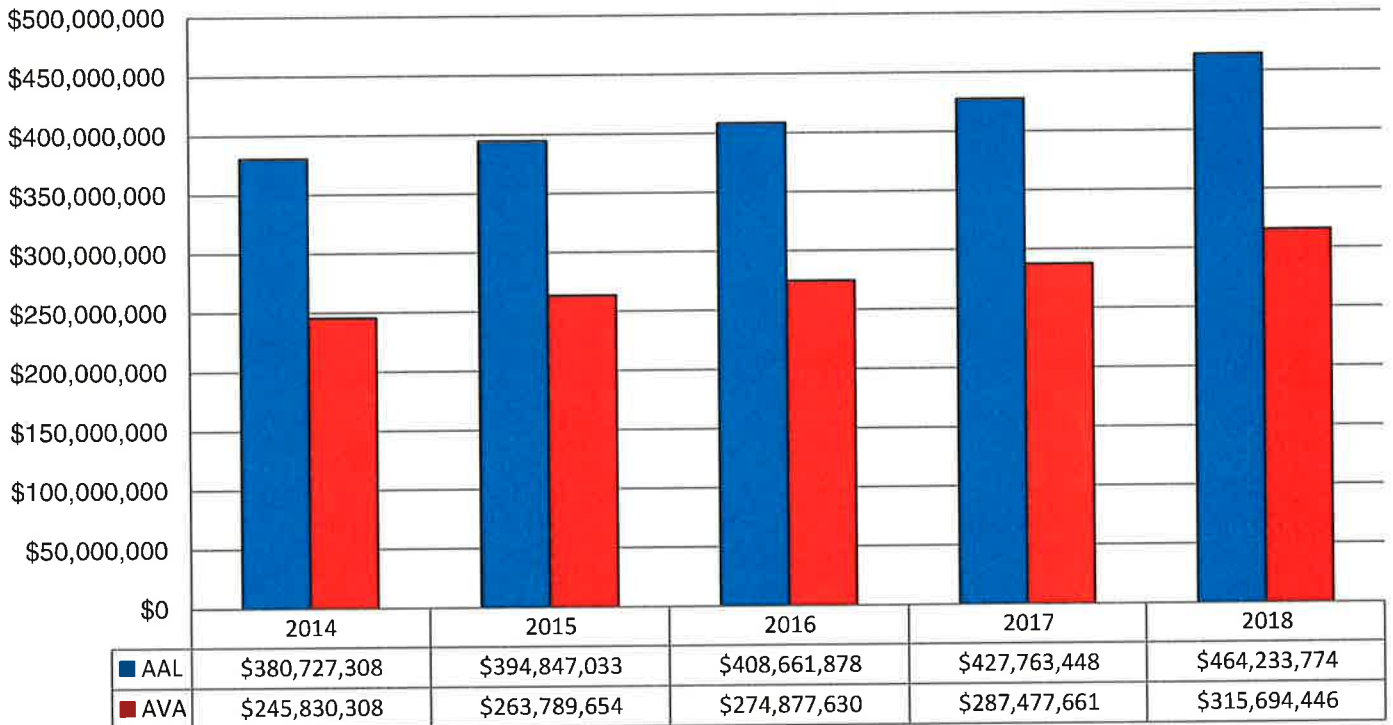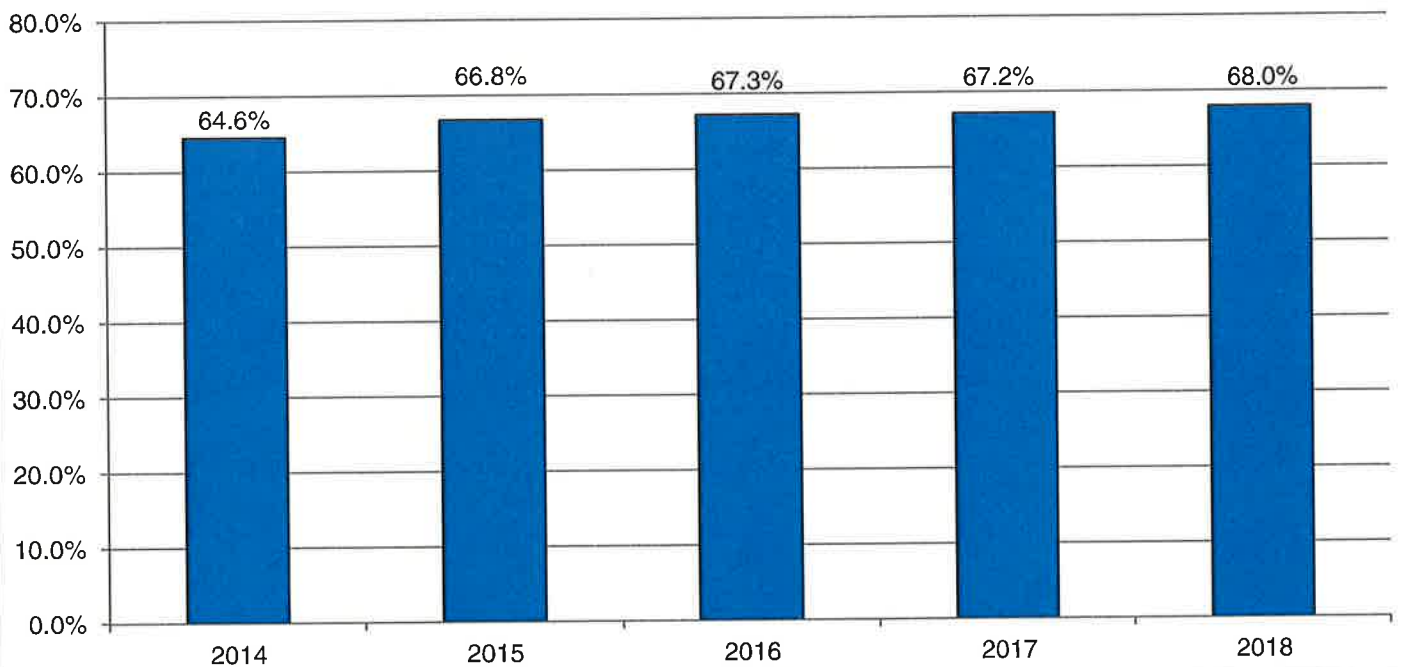
Historical Market and Actuarial Value of Assets

Year	Market Value of Assets	Actuarial Value of Assets	AVA as % of MVA
2018	326,905,394	315,694,446	96.6%
2017	283,902,001	287,477,661	101.3%
2016	269,935,429	274,877,630	101.8%
2015	267,549,482	263,789,654	98.6%
2014	258,340,593	245,830,308	95.2%
2013	219,605,063	219,494,329	99.9%
2012	200,860,360	205,795,168	102.5%
2011	199,988,291	196,119,468	98.1%
2010	179,166,378	177,797,061	99.2%
2009	151,275,593	167,993,744	111.1%
2008	184,386,700	177,833,982	96.4%
2007	175,115,759	165,309,144	94.4%
2006	157,653,656	151,686,147	96.2%
2005	148,916,100	142,402,678	95.6%
2004	137,080,947	132,768,961	96.9%
2003	119,929,319	125,237,848	104.4%
2002	126,751,547	126,336,366	99.7%
2001	125,752,053	123,971,024	98.6%
2000	123,913,647	117,625,992	94.9%

History of Plan Funding

Year	Actuarial Value Of Assets ($1,000s)	Actuarial Accrued Liability Before Changes ($1,000s)	Actuarial Accrued Liability After Changes ($1,000s)	Funded Ratio Before Changes	Funded Ratio After Changes
2018	$315,694	$464,170	$464,234	68.0%	68.0%
2017	287,478	428,146	427,763	67.1%	67.2%
2016	274,878	412,283	408,662	66.7%	67.3%
2015	263,790	394,847	394,847	66.8%	66.8%
2014	245,830	380,727	380,727	64.6%	64.6%
2013	219,494	362,117	362,117	60.6%	60.6%
2012	205,795	343,542	343,178	59.9%	60.0%
2011	196,119	321,700	321,700	61.0%	61.0%
2010	177,797	307,407	307,407	57.8%	57.8%
2009	167,994	290,127	290,127	57.9%	57.9%
2008	177,834	269,970	270,351	65.9%	65.8%
2007	165,309	253,386	248,986	65.2%	66.4%
2006	151,686	239,229	239,602	63.4%	63.3%
2005	142,403	221,642	221,642	64.2%	64.2%
2004	132,769	204,952	204,952	64.8%	64.8%
2003	125,238	188,697	188,697	66.4%	66.4%
2002	126,336	167,690	172,615	75.3%	73.2%
2000	117,626	124,906	127,011	94.2%	92.6%
1998	97,626	107,071	108,391	91.2%	90.1%
1996	81,626	78,202	83,472	104.4%	97.8%
1994	69,860	71,242	72,869	98.1%	95.9%
1992	60,912	59,747	66,161	101.9%	92.1%
1990	48,387	47,474	48,717	101.9%	99.3%
1988	37,662	36,212	37,390	104.0%	100.7%
1986	30,161	27,830	30,455	108.4%	99.0%
1984	21,752	20,912	22,203	104.0%	98.0%
1982	16,115	16,687	17,828	96.6%	90.4%
1980	11,468	15,229	15,597	75.3%	73.5%

Retiree Benefit Increase

This valuation summary does not include a retiree benefit increase since the funded ratio on the valuation date did not exceed the target funding ratio established in 2004. The January 1, 2018 target funded ratio was 89.3%, while the actual funded ratio was 68.0%.

Increases in the monthly benefit paid to retirees were granted in some prior years following a review of the funded position of the Pension Plan. The last increase was granted in 2002. The monthly retiree benefits were increased by 3% but not less than $5 per month.

As the funded status was being discussed in 2004 the Pension Committee considered a policy related to granting increases to retirees when the funded percentages were less than 100%. Forecasts of the funded position completed at that time indicated the funded percentage would remain below 100% for more than 20 years.

The policy that was discussed would give the Committee the discretion to consider an increase if the funded percentage was on track and ahead of schedule. The funding would be on track and ahead of schedule if the funded percentage fell above a straight line drawn from the funded percentage of 64.8% in 2004 to 100% by 2024. While this standard was outlined and discussed on other occasions since 2004, the Committee has not taken a formal position on the policy.

So that the Committee can review the status of funding since 2004 related to this policy, the following display has been updated. As indicated, the funded position has not increased to be on track and ahead of schedule since 2004.

Target Funding Ratio - Retiree Benefit Increase
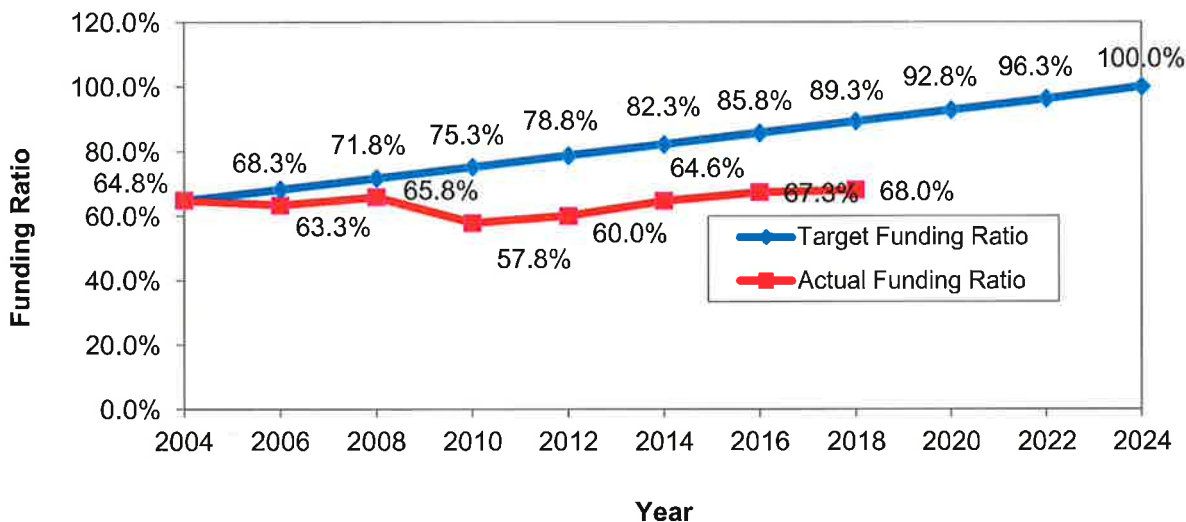
History of Plan Changes

2016   Long Term Disability provision for active members was eliminated from the Plan as of 7/1/2015. LTD is provided by insurance outside of the pension plan. The interest crediting rate on employee contributions was changed from 5% to the 10-Year Treasury rate for November prior to the valuation date as of 1/1/2016.

2012   Certain bargaining employees hired after June 30, 2011 and all non-bargaining employees hired after December 31, 2011. It is anticipated that all bargaining units will be under these same benefit provisions after their next contract is negotiated.

- 1.5% of pay per year of service (45% maximum)
- No Rule of 75
- 8.5% contribution rate
- Early Retirement at age 50 and 10 years of service or age 60 and 5 years of service
- Early Retirement reduction of 5% per year

Sheriff Deputies hired after June 30, 2011
- Benefit formula changed to the following:
  - 1.0% of pay for 1 to 10 years of service
  - 2.0% of pay for 11 to 20 years of service
  - 2.5% of pay for 21 to 32 years of service
- Contribution rate changed to the following:
  - 8.5% for 1-32 years of service
  - 7.5% at 33 years of service
  - 6.5% at 34 years of service
  - 5.5% at 35+ years of service
- Early Retirement at age 53
- Early Retirement reduction of 4.8% per year
- No Early Retirement reduction if 30 or more years of service

2008   Member and County contribution rate increased from 7.5% to 8.5%

2007   Member and County contribution rate increased from 6.5% to 7.5%

2006   Member and County contribution rate increased from 5.5% to 6.5%

2003   Beginning March 2003 all new retirees have their pension benefit paid from plan assets but not covered under an insurance contract.

2002   Increase retiree pension by 3%, but not less than $5 a month

2000   Increase retiree pension by 4%, but not less than $5 a month

1998 Increase retiree pension by 3%, but not less than $5 a month

1997
- Rule of 75 for other than law enforcement
  - Unreduced benefit upon Rule of 75
  - 2.0% benefit formula after January 1, 1962
  - 5.5% member contributions

1996
- Rule of 75 for law enforcement
  - Unreduced benefit upon Rule of 75
  - 2.0% benefit formula after January 1, 1962
  - 5.5% member contributions
- Participation begins on first day of employment
- Increase retiree pension by 4% but not less than $10 a month

1994
- Benefit formula change to the following:
  - 1% of pay for service before January 1, 1962
  - 1.5% of pay for service after January 1, 1962
- Decrease in interest rate on employee contributions to 5% effective July 1, 1994
- Increase retiree pension by 3%

1992
- Early Retirement Incentive Program (112 members elected benefit)
- Early Termination of Employment Incentive Program (188 members elected benefit)
- Increase retiree pension by 3%

1990
- Benefit formula change to the following:
  - 1% of pay for service before January 1, 1962
  - 1.4625% of pay for service after January 1, 1962
- Increase retiree pension by 4%
- Vesting changed from 25% after 5 graded to 100% after 15 to 25% after 5 increased 15% a year up to 10
- Maximum Disability Benefit increased from $36,000 to $57,600

1988
- Benefit formula change to the following:
  - 1% of pay for service before January 1, 1962
  - 1.425% of pay for service after January 1, 1962
- Increase retiree pension by 4%, but no less than $5 a month
- Changed eligibility requirements to include participants hired after age 60

1986
- Benefit formula change to the following:
  - 1% of pay for service before January 1, 1962
  - 1.2% of pay for service from January 1, 1962 to January 1, 1972
  - 1.4% of pay for service after January 1, 1972
- Increase retiree pension by 6% but not less than $5 a month

1984
- Increased benefit formula from 1.1% of pay to 1.2% for service after January 1, 1974
- Increase retiree pension by 6%, but not less than $5 a month

1982
- Added Special Early Retirement
- Benefit formula change from 1% of pay to 1.1% of pay for service after January 1, 1972
- Increase retiree pension by 6%, but not less than $10 a month
- Changes in disability retirement provisions
- Changes in actuarial assumptions
- Special provisions for county employees change to state employees

1980
- Special Early Retirement
- Change in service definition – unlimited sick leave
- $10/month increase in pension to retirees
- Added Late Retirement Benefit

Actuarial Cost Method

Annual costs were calculated using the Projected Unit Credit Actuarial Cost Method. Projected Unit Credit is one of the Accrued Benefit Actuarial Cost Methods. Using Projected Unit Credit, annual costs equal the sum of the normal cost and an amount to amortize the unfunded accrued liability. The normal cost is defined as the actuarial value of retirement and ancillary benefits that are allocated to the current year.

The unfunded accrued liability is equal to the accrued liability reduced by the actuarial value of plan assets. The accrued liability is defined as the actuarial value of retirement and ancillary benefits that have been allocated to years of service prior to the current year.

The method allocates an equal amount of a participant's projected retirement benefit to each year of service. The benefit at normal retirement is projected assuming salaries increase at the assumed rates. The projected retirement benefit is then divided by the participant's years of service to determine the portion of the retirement benefit allocated to each year. Service includes years following the later of the date of hire and July 1, 1952 (January 1, 1955 for former Board of Health participants) and prior to the assumed retirement age.

As experience develops under the Retirement Plan, actuarial gains and losses will result. Actuarial gains and losses indicate the extent to which actual experience is deviating from that expected on the basis of the actuarial assumptions. Actuarial gains result from experience more favorable than assumed and reduce the unfunded accrued liability. Actuarial losses result from experience less favorable than assumed and increase the unfunded accrued liability. All actuarial gains and losses are included in the determination of the unfunded accrued liability as of the valuation date.

The unfunded actuarial accrued liability is amortized over 25 years on a fixed percentage of pay, closed layered basis. This amortization method was adopted effective January 1, 2017.

Asset Valuation Method

The Actuarial Value of Plan Assets held in the pension trusts was calculated as the sum of the following:

- Adjusted Value of Plan Assets
- One-half of the excess of Market Value over the Adjusted Value of Plan Assets

The Adjusted Value of Plan Assets equals:

- Actuarial Value of Plan Assets on the prior valuation date, plus contributions and expected interest, less
- Pensions paid, refunds and other disbursements with expected interest

Actuarial Assumptions

Investment Return   7.5% compounded annually.

Salary Scale   Salaries were assumed to increase at an annual rate compounded annually following the valuation date varying by age, as illustrated below.

Age	Percentage Increase
18-44	5.50%
45-54	5.00%
55+	4.50%

Mortality Rates   The static, combined healthy lives RP-2000 mortality tables projected to 2017 and further projected 7 years for annuitants and 15 years for non-annuitants. Separate tables are used for annuitants and non-annuitants as well as for male and female.

Disability Rates   None.

Withdrawal Rates   Based on rates as illustrated below:

Age	Rate
22	28.3%
27	12.7%
32	10.0%
37	8.2%
42	5.9%
47	4.0%
52	2.3%
57	1.9%

Accrued Sick Leave   7 days per year.

Actuarial Assumptions
(continued)

Retirement Rates

Age	Rule of 75	Other
50	30%	5%
51-54	5%	2%
55-61	10%	5%
62-64	20%	10%
65-69	30%	30%
70	100%	100%

Retirement rate is 30% the first year a Member is eligible for Rule of 75.

Age	Sheriffs Hired after June 30, 2011
53-54	5%
55	25%
56-57	15%
58	20%
59-61	25%
62	30%
63	35%
64	40%
65	100%

Retirement rate is 100% for sheriffs hired after June 30, 2011 at 30 years of service.

Interest Rate on Employee Contributions

2.35% per annum.

Administrative Expenses

Annual administrative expenses have been estimated as 3/10 of 1% of plan assets.

Summary of Plan Provisions

Effective Date	January 1, 1963
Plan Year	January 1 through December 31.
Participation	First day of continuous employment.

Definitions

Member

Any employee who participates in the Plan as an active participant or a non-active participant entitled to a disability pension, a deferred vested retirement benefit or a current retirement benefit.

Benefit Service

Years of service following the later of July 1, 1952 and the date of hire and prior to the normal retirement date. Years of service prior to January 1, 1955 are not considered for members who were participants of the Omaha-Douglas County Board of Health Retirement Plan.

Final Average Compensation

Average monthly compensation paid during the 60 consecutive months of the last 120 months of service that produces the largest average monthly compensation. The average monthly compensation is limited for members who were participants of the Omaha-Douglas County Board of Health Retirement Plan prior to 1975.

Normal Retirement Date

First day of calendar month coinciding with or next following the 65th birthday (age 55 for sheriff deputies hired after June 30, 2011).

Rule of 75 Retirement

First day of calendar month coincident with or next following the attainment of age 50, and completion of a sufficient number of years of service so that when such years are added to the members attained age, the total equals or exceeds 75. Such service must be exclusive of accumulated sick leave.

There is no Rule of 75 Retirement for bargaining employees hired after June 30, 2011 (or later date based on applicable bargaining unit contract) and all non-bargaining employees hired after December 31, 2011.

Summary of Plan Provisions

(continued)

Early Retirement

Following attainment of age 55 and 20 years of service, or age 60 and 5 years of service. Age 53 for sheriff deputies hired after June 30, 2011. Age 50 and 10 years of service or age 60 and 5 years of service for bargaining employees hired after June 30, 2011 (or later date based on applicable bargaining unit contract) and all non-bargaining employees hired after December 31, 2011.

Benefits

Normal Retirement

For participants who were actively employed on October 4, 1997 and retire thereafter, a monthly income equal to the sum of (1) and (2), not to exceed 60% of the participant's final Average Compensation:

(1)   1% of Final Average Compensation, multiplied by years of benefit service prior to January 1, 1962, plus

(2)   2.0% of Final Average Compensation multiplied by years of benefit service following January 1, 1962.

For bargaining employees hired after June 30, 2011 (or later date based on applicable bargaining unit contract) and all non-bargaining employees hired after December 31, 2011, a monthly income equal to 1.5% for each year of service not to exceed 45% of the participant's final Average Compensation.

For sheriff deputies hired after June 30, 2011, a monthly income equal to the sum of (1), (2) and (3), not to exceed 60% of the participant's final Average Compensation:

(1)   1.0% of Final Average Compensation multiplied by 1-10 years of benefit service.

(2)   2.0% of Final Average Compensation multiplied by 11-20 years of benefit service.

(3)   2.5% of Final Average Compensation multiplied by 21-32 years of benefit service.

Early Retirement

Monthly income computed in the same manner as normal retirement, based on benefit service and final average compensation at the early retirement date, and reduced by 1/4 of 1% for each full calendar month that the initial retirement payment precedes the normal retirement date.

Reduced by .4167% for each full calendar month that the initial retirement payment precedes the normal retirement date for bargaining employees hired after June 30, 2011 (or later date based on applicable bargaining unit contract) and all non-bargaining employees hired after December 31, 2011.

Reduced by .4% for each full calendar month that the initial retirement payment precedes the normal retirement date for sheriff deputies hired after June 30, 2011.

Rule of 75 Retirement

If the eligibility requirements for Rule of 75 Retirement are met, the early retirement benefit will not be reduced for the period that retirement precedes the normal retirement date.

Late Retirement

A member who attains the age of 65 after December 31, 1987, shall be entitled to the Normal Retirement Benefit based on Years of Service and Final Average Compensation determined as of the late Retirement Date.

Death

A benefit of 60% of earned pension is payable until death of the spouse if an employee has completed 8 years of service at the date of death. The earned pension is based on length of service and final average compensation to the date of death. The participant and spouse must be married for at least one year prior to date of death.

If the employee is not survived by dependents or does not qualify for the spouse benefit, the employee's contributions, plus accumulated interest is paid to the beneficiary upon death.

Termination Benefit

Deferred monthly income equal to the earned benefit based on service and compensation to the date of termination and multiplied by a vesting factor:

Completed Years of Service on Date of Termination	Vesting Factor
Less than 5	0.00
5	0.25
6	0.40
7	0.55
8	0.70
9	0.85
10 Years and Over	1.00

If a member's employment is terminated due to a change in employment status as provided by the Nebraska Legislature to that of a state employee, such member's Vested Factor will be 1.00. The termination benefits to which he is entitled shall be based on the average monthly compensation of the member during Douglas County employment and/or state employment which immediately follows Douglas County employment.

Upon termination prior to qualifying for a vested pension or in lieu of the vested pension, the employee may withdraw his contributions increased by interest. Effective July 1, 1994, the interest rate credited is 5% compounded annually. This interest rate credit was changed to the 10-year treasury rate for the month of November, preceding the plan year, as of January 1, 2016.

Form of Annuity

Normal Form

Joint life annuity, 60% continuing to spouse or dependent children.

Five years certain and life, if no eligible dependents.

Summary of Plan Provisions

(continued)

Contribution

Participant

Members contributed 5.5% of total earnings prior to January 1, 2006. The annual contribution rate increased to 6.5% as of January 1, 2006, 7.5% as of January 1, 2007 and 8.5% as of January 1, 2008 and thereafter.

Sheriff deputies hired after June 30, 2011 contribute according the following schedule:

Years of Service	Percentage
Less than 33	8.50%
33	7.50%
34	6.50%
35 or more	5.50%

Effective July 1, 1985, the Employee contribution is "picked up" and contributed to the Plan by Douglas County.

County

The County pays the balance of the cost of the plan. By law, the County cannot contribute more than the participants for pension earned after the effective date of the plan. The County pays for all benefits earned for service before the plan was effective.

Participant Census Statistics

	Plan Year Beginning January 1		
	2016	**2017**	**2018**
Active Participants			
Number	2,122	2,146	2,182
Average Attained Age	45.0	45.2	45.1
Average Past Service	10.6	10.7	10.5
Total Annual Compensation	$114,241,647	$119,649,815	$124,582,198
Average Annual Compensation	53,837	55,755	57,095
Non-Active Participants			
Number	1,396	1,434	1,484
Average Attained Age	67.8	67.5	67.5
Total Annual Benefits	24,544,766	25,707,177	28,191,227
Average Annual Benefit	17,582	17,927	18,997

Participant Census Statistics

(continued)

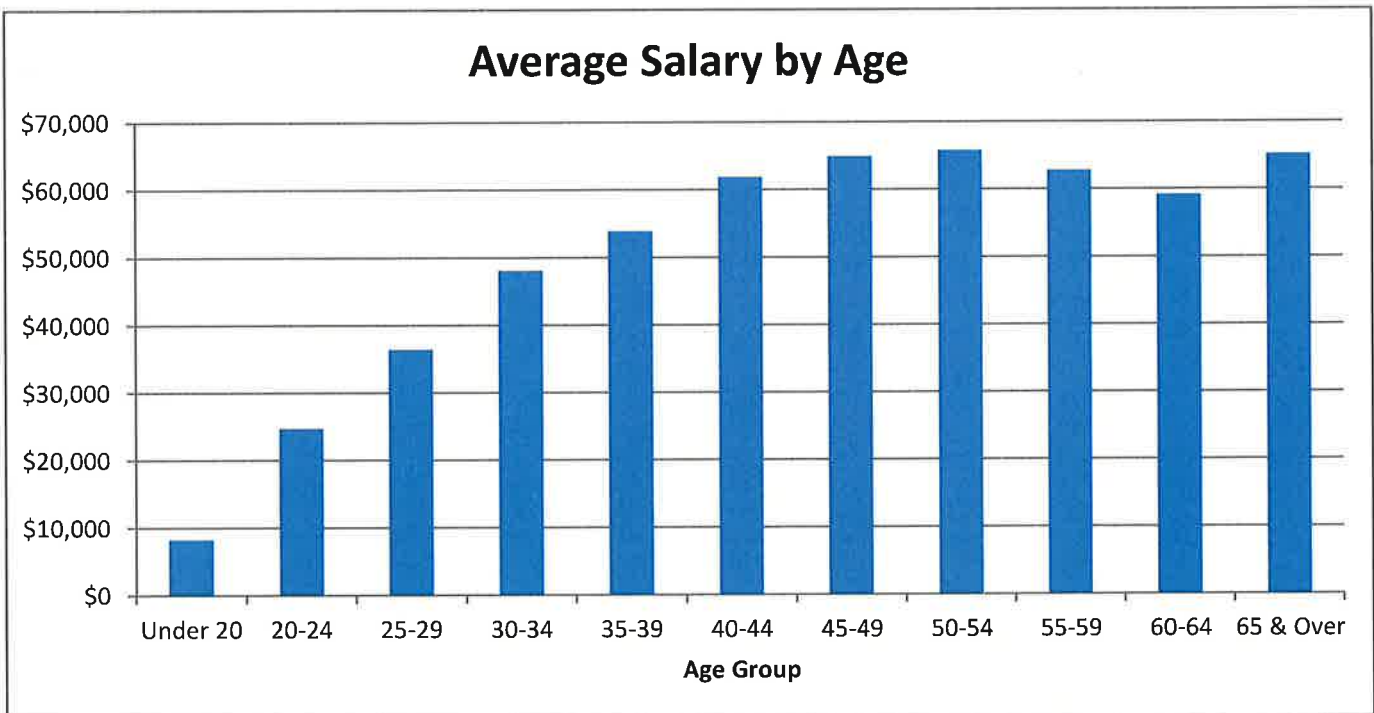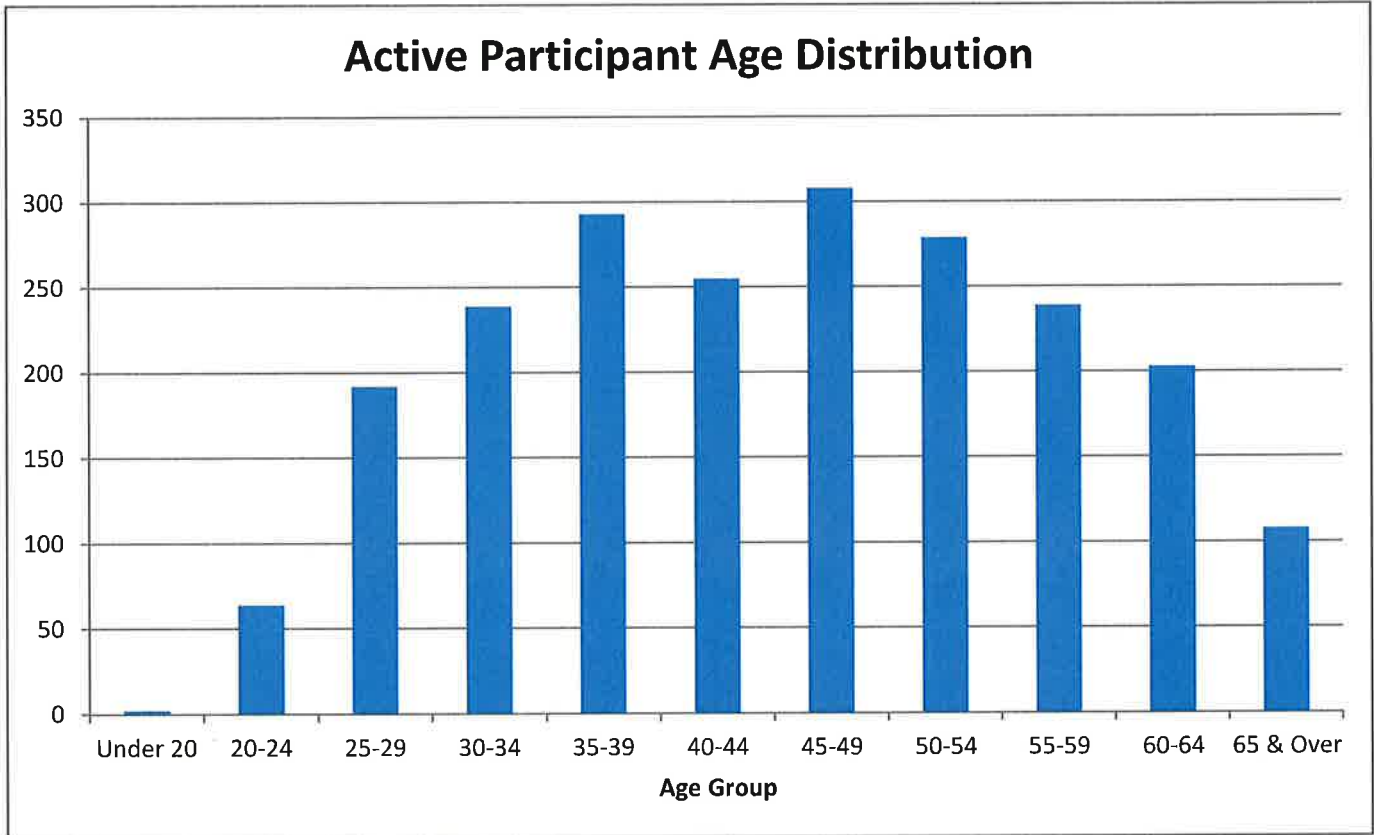## January 1, 2018

Active Participants Included in Valuation

Age at Valuation Date	Years of Service									Average Salary
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	Total	
Under 20	2	0	0	0	0	0	0	0	2	8,298
20-24	63	1	0	0	0	0	0	0	64	24,784
25-29	176	16	0	0	0	0	0	0	192	36,609
30-34	140	64	34	1	0	0	0	0	239	48,456
35-39	110	82	80	21	0	0	0	0	293	54,654
40-44	70	45	63	69	8	0	0	0	255	62,010
45-49	55	54	58	74	48	19	0	0	308	65,063
50-54	43	47	53	53	45	33	5	0	279	66,043
55-59	46	37	50	37	32	19	14	4	239	62,803
60-64	34	36	43	38	26	13	10	3	203	59,245
65 & Over	19	21	19	18	16	3	3	9	108	65,200
Total	758	403	400	311	175	87	32	16	2,182 *	57,095
Average Salary	38,437	58,515	66,058	68,814	74,794	79,856	77,880	94,518		

Average Salary - based on reported compensation for calendar 2017.

* 850 actives (39.0% of all active participants) are under the reduced plan formula.

Douglas County Employees' Retirement Plan

Active Participant Age Distribution

Average Salary by Age

Participant Census Statistics

January 1, 2018
Non-Active Participants Included in Valuation

	Number	Total Annual Benefit	Average Annual Benefit
Retired & Beneficiary	1,259	$24,982,760	$19,843
Vested Terminated	106	1,159,950	10,943
Terminated Non-Vested	91	1,317,806	14,481 *
Disabled Participants	28	730,711	26,097
Total	1,484	28,191,227	18,997

* Amount equal to expected refund of member contributions.

Retired & Beneficiary Participants in Pay Status

Age	Number	Total Annual Benefit	Average Annual Benefit
Under 50	15	$166,001	$11,067
50-54	39	1,375,421	35,267
55-59	101	3,084,677	30,541
60-64	168	4,535,817	26,999
65-69	309	7,041,649	22,789
70-74	218	3,963,512	18,181
75-79	143	2,246,631	15,711
Over 79	266	2,569,052	9,658
Total	1,259	24,982,760	19,843

Disabled Participants in Pay Status**

Age	Number	Total Annual Benefit	Average Annual Benefit
Under 45	0	$0	$0
45-49	1	9,346	9,346
50-54	1	4,163	4,163
55-59	2	20,220	10,110
Over 59	2	22,982	11,491
Total	6	56,711	9,452

**Disability payments are paid from the Plan for the first 5 years. Payments after five years are paid under the disability insurance contract for eligible disabled participants prior to July 1, 2015.

Participant Census Statistics
(continued)

	Active	Non-Active				Total
		Deferred	Disabled	Retired	Beneficiary	
Number on January 1, 2017	2,146	190	26	1,011	207	3,580
Terminated						
Non-Vested	0	0	0	0	0	0
Vested - Lump Sum	-78	-60	0	0	0	-138
Vested - Deferred	-79	+79	0	0	0	0
Disabled	-6	0	+6	0	0	0
Deceased						
Vested - Lump Sum	0	0	0	0	0	0
Vested - Beneficiary	-2	0	-1	-11	+18	+4
No Additional Benefit	0	0	0	-15	-14	-29
Retired						
Monthly Benefit	-55	-9	-3	+67	0	0
Lump Sum	0	0	0	0	0	0
Certain Period Expired	0	0	0	0	-6	-6
Return to Active	+3	-3	0	0	0	0
New Entrants or Prior Omissions During Plan Year	+253	0	0	+1	+1	+255
Number on January 1, 2018	2,182	197	28	1,053	206	3,666

Non-Active Participants	Number	Annual Benefit
Deferred Participants		
Vested Participants	106	$1,159,950
Non-vested Participants	91	1,317,806 *
Disabled Participants	28	730,711
Retired & Beneficiary Participants	1,259	24,982,760

* Amount equal to expected refund of member contributions.

Appendix B

Eastern Nebraska Health Agency
Retirement Plan Information

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2018 Report
Eastern Nebraska Human Services Agency Employees Retirement Plan

1.   Information for plan years 2013 through 2018*:

	2018	2017	2016	2015	2014	2013
Funding Status	74%	N/A	71%	N/A	76%	N/A
Assumed rate of return	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Prior year actual return	11.7%	6.8%	0.2%	6.4%	15.6%	9.1%
Member contribution rates: % of pay	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
Employer contribution rates: % of pay	9.5%	9.0%	8.5%	8.0%	7.5%	7.0%
Normal cost: % of pay	7.4%	N/A	7.0%	N/A	7.1%	N/A
ARC: % of pay	12.19%	11.55%	11.55%	10.77%	10.77%	11.38%
ARC ($)	$2,923,820	$2,668,776	$2,603,684	$2,241,905	$2,197,946	$2,528,319
Contribution ($)	TBD	$2,900,037	$2,783,724	$2,427,556	$2,246,729	$2,131,677
Contribution: % of ARC	TBD	108.7%	106.9%	108.3%	102.2%	84.3%

* Actuarial Valuations are conducted every other year.

2.   **Circumstances that led to the current underfunding of the retirement plan:** Prior to 2014, actual contributions were significantly less than the ARC. Additionally, investment losses resulting from the financial crisis of 2008/09 significantly reduced the plan's funding status. For the most recent 2018 valuation, changes in assumptions (described in the next question) also reduced the funding status. The 2018 funded status would have been 77% based on the consistent assumed mortality table.

3.   **Changes in the actuarial methods and/or assumptions since the previous actuarial valuation report:** For the 2018 actuarial valuation, the mortality table was updated to the Static IRS 2018 annuitant-distinct mortality table, based on the RP 2014 mortality table. The unfunded accrued liability amortization period was changed as of January 1, 2018 from a 30

year open amortization to a 25 year closed layer amortization. There were no other changes in the actuarial assumptions or methods.

4. **Year the plan funding ratio expected to reach 100%:** 2042 based on the January 1, 2018 census data and assets and projected with assumptions as described in the January 1, 2018 valuation report.

5. **Method used to amortize the unfunded actuarial liability:** 25 years on fixed level dollar, closed layered basis.

6. **Corrective actions implemented to improve the funding status of the plan:** The agency has been increasing employer contributions by one-half percent annually since 2010. The most recent forecast study was completed in October 2018 (see attached). The forecast shows steady future annual improvements in the funding status with the current contribution schedule, with the forecasted funding status exceeding 80% in 6 years.

7. **Negotiations with bargaining groups:** The majority of the agency's employees are covered under a collective bargaining agreement. As of this report, the agency is not in negotiations for any plan changes.

8. **The most recent Actuarial Experience Study was completed in July 2016 and is attached.**

9. **The current assumed rate of return is 7%.** This assumption has not been changed since inception of the Plan. The rate is reviewed in the Actuarial Experience Study conducted every four years.

10. **The report for the January 1, 2018 actuarial valuation is attached.**

SilverStone
GROUP

October 15, 2018

Ms. Robyn Hansen
Eastern Nebraska Human Services Agency
4715 South 132nd St
Omaha, NE 68137

Re: Employees Retirement Plan Forecast Study

Dear Robyn:

We have estimated the funded ratios for the Retirement Plan for the next 25 years. Please note, the values presented are only estimates, as the actual amounts will be based on census data and plan experience, actual asset values and assumptions applied in future years, as well as other variables. Therefore, actual future measures will differ from these estimates as actual future experience differs from assumed experience.

The funded ratio is the ratio of the plan assets to the actuarial accrued liability. For active participants, the latter amount is the actuarial measure of benefits based on service to date and pay projected to retirement. For all other participants, it is the measure of their actual vested benefit.

Forecast Results
The forecast applies the current employer contribution schedule. This assumes the current 2018 employer contribution of 9.50%, and the employee contribution of 2.75%, will continue each year following. Under the assumptions applied, a funded ratio greater than 100% will be attained in 24 years. The results are summarized in the table on the following page.

Assumptions
All methods and assumptions are consistent with those applied to complete the 2018 valuation. Please refer to pages 8 through 10 of the January 1, 2018 Actuarial Valuation Report for a complete description of these methods and assumptions. The forecast begins with the census and valuation results as of January 1, 2018. Assets are projected beginning with total assets as of December 31, 2017. Refer to the valuation report for a summary of the census, funding results and asset development. The estimated funded ratios may be less if plan asset performance is less than the 7% rate of return assumption, if experience is other than assumed, if plan provisions are changed to increase benefits, or if actuarial assumptions are changed.

Please call us at 402.964.5490 or 402.964.5439 to discuss the results or for any alternative assumptions or contribution rates.

Sincerely,

Glen C. Gahan, FSA
Principal

Renee A. Nolte, ASA
Senior Consultant

Enclosure

Eastern Nebraska Human Services Agency
Employees Retirement Plan
Estimated Funded Ratios

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Scenario 1 – Level Contribution Percent Beginning 2018																				
Funding Basis	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Employer Contribution Percent	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%
Employee Contribution Percent	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%	2.75%
Total Contribution Percent	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%	12.25%
Employer Contribution (000's)	2,279	2,336	2,394	2,454	2,515	2,578	2,642	2,709	2,776	2,846	2,917	2,990	3,064	3,141	3,220	3,300	3,383	3,467	3,554	3,643
Funded Ratio	74.2%	75.5%	76.6%	77.7%	78.8%	79.8%	80.7%	81.7%	82.6%	83.6%	84.5%	85.4%	86.3%	87.3%	88.3%	89.4%	90.5%	91.6%	92.7%	93.9%

August 3, 2018

PERSONAL AND CONFIDENTIAL

Ms. Robyn Hansen
Eastern Nebraska Human Services Agency
4715 South 132nd Street
Omaha, NE 68137

RE: Employees Retirement Plan

Dear Robyn:

We have completed our work on the actuarial valuation for the Eastern Nebraska Human Services Agency Employees Retirement Plan. Enclosed for your review are 15 copies of the Actuarial Valuation Report for the plan year beginning January 1, 2018.

The Report Highlights section summarizes the valuation results. The actuarial formula to determine the Recommend Employer Contribution is based on an amount equal to the excess of the plan's Normal Cost over the anticipated employee contributions, plus an amount to amortize the unfunded accrued liability over a 25-year period. This amortization period has been decreased from a 30-year period used in the 2016 actuarial valuation.

The valuation recognizes the updated participant and plan asset information as of January 1, 2018. The mortality table was updated from the IRS 2016 table (based on the RP 2000 table) to the IRS 2018 table (based on the RP 2014 table). All other actuarial methods and assumptions are the same as those used for the prior valuation. In our opinion, these methods and assumptions are appropriate.

Please call if we can provide additional information.

Sincerely,

Glen C. Gahan, FSA, MAAA
Enrolled Actuary

GCG/ks

Enclosures

EASTERN NEBRASKA HUMAN SERVICES AGENCY EMPLOYEES RETIREMENT PLAN

Actuarial Valuation Report

January 1, 2018

SilverStone
GROUP

August 3, 2018

ACTUARIAL CERTIFICATION

Pension Committee
Eastern Nebraska Human Services Agency
4715 South 132nd Street
Omaha, NE 68137

Dear Committee Members:

An actuarial valuation was performed for the Eastern Nebraska Human Services Agency
Employees Retirement Plan as of January 1, 2018. The valuation was prepared to
determine the value of accrued benefits and annual costs. The results of the valuation
are contained in the accompanying report.

The valuation is based on eligible employees submitted by your office. A statement of
plan assets was furnished by United of Omaha, American Funds, and Stichler Wealth
Management. We have not made an independent audit of this data, but have relied on
the accuracy of the information that was supplied.

To the best of my knowledge, the information supplied in this report is complete and
accurate and in my opinion the assumptions are reasonably related to the experience of
the Plan and to reasonable expectations and represent my best estimate of anticipated
experience under the Plan. However, future measures may differ significantly from the
current measurement. Due to the limited scope of our assignment, this report does not
include an analysis of the potential range of such future measures. The undersigned
meets the Qualification Standards of the American Academy of Actuaries to render the
actuarial opinion contained in this report.

Sincerely,

Glen C. Gahan, FSA, MAAA
Enrolled Actuary

GCG/ks

Enclosure

Table of Contents

Financial Highlights

	2016	2017	2018
Annual Contributions			
Recommended	2,603,684	2,668,776 *	2,923,820
Actual	2,783,724	2,900,037	N/A
Plan Assets	33,595,512	36,287,530	40,879,777
Prior Year Investment Return	0.2%	6.8%	11.7%
Funding Basis			
Actuarial Accrued Liability	47,305,934		55,125,381
Plan Assets	33,595,512		40,879,777
Unfunded Actuarial Accrued Liability	13,710,422		14,245,604
Accrued Benefit Basis			
Vested Benefit Value	43,521,210		50,842,736
Accrued Benefit Value	44,386,988		51,902,778
Funded Ratios**			
Funding Basis - AAL	71%		74%
Accrued Benefit Basis	76%		79%
Normal Cost	1,571,092		1,781,369
As a percent of covered payroll	7.0%		7.4%
Interest Rates			
Funding Basis	7.00%		7.00%
Accrued Benefit Basis	7.00%		7.00%
Annual Covered Payroll	22,545,677		23,985,346
Number of Participants			
Active and Disabled	678		668
Retired and Beneficiary	216		251
Vested Terminations and Transfers	77		76
Total	971		995

*   Increased from prior year recommended contribution by 2.5% salary scale.
**   Ratio of plan assets to applicable actuarial liability.

Comments on the Valuation

The results of the actuarial valuation prepared for the Eastern Nebraska Human Services Agency Employees Retirement Plan as of January 1, 2018 are summarized in this report. The following observations are provided regarding the report.

Plan Experience

Examining the overall plan experience since the last valuation on January 1, 2016, we note:

- Since the prior valuation, the number of active participants has decreased from 678 to 668. Annual covered payroll for participants under Normal Retirement Age increased from $22,545,677 to $23,985,346, a 6.4% increase. The average salary for participants under Normal Retirement Age increased from $35,394 to $37,951, a 7.2% increase.

- For active participants included in the valuation, average age increased from 45.0 to 45.2 years and average service increased from 10.4 to 10.9 years.

- The investment return on plan assets since the prior valuation was higher on average than the assumed 7.0% rate. The approximate investment return rate for 2016 was 6.8%, and for 2017 was 11.7%.

- On the same actuarial basis as used in 2016 and prior to any assumption changes, the Unfunded Accrued Liability (UAL) decreased by $1,290,000, from $13,710,000 to $12,420,000. Contributing factors were:

    - Investment return rates greater than expected decreased the UAL by approximately $1,630,000.

    - Contributions more than the Normal Cost plus interest on the UAL subtracted about $440,000 from the UAL.

    - Net actuarial losses from other sources increased the UAL by approximately $780,000.

Comments on the Valuation

Actuarial Assumptions

The mortality table was updated to the static IRS 2018 annuitant-distinct mortality table based on the RP 2014 table. The effect of this change increased the UAL by $1,822,710. The corresponding increase in the normal cost was $52,457.

All other assumptions are the same as those used in the 2016 valuation.

Recommended Contribution

The recommended contribution consists of the plan's normal cost plus a 25-year amortization payment of the unfunded accrued liability. This amortization period is closed for the initial unfunded actuarial accrued liability (UAAL) as of Janaury 1, 2018. New bases will be established in future years for changes in the UAAL due to changes in plan provisions, actuarial assumptions and experience (gains)/losses.

We recommend ENHSA increase the total contribution to the plan to at least $2,923,820 for 2018. Plan contributions include amounts contributed by the employees and by the employer. For 2018, the anticipated employee contributions at the current rate of 2.75% are $659,597 and the anticipated employer contributions at the current rate of 9.5% are $2,278,608 for a total of $2,938,205.

Annual Contributions

Annual contributions to the Retirement Plan as illustrated herein are comprised of employee contributions equal to a percentage of expected compensation as of the valuation date and an amount payable by the employer.

| | | January 1, 2018 | |
	January 1, 2016	Before Assumption Changes	After Assumption Changes*
Recommended Contribution			
Normal Cost	$1,571,092	$1,728,912	$1,781,369
Unfunded Accrued Liability Payment	1,032,592	996,276	1,142,451
Total	2,603,684	2,725,188	2,923,820
Expected Employee Contribution			
Employee Contribution Rate	2.75%	2.75%	2.75%
Covered Payroll	22,545,677	23,985,346	23,985,346
Expected Employee Contribution	620,006	659,597	659,597
Recommended Employer Contribution			
Normal Cost less Employee Contribution	951,086	1,069,315	1,121,772
Employer Normal Cost as a Percent of Pay	4.22%	4.46%	4.68%
Total Contribution less Employee Contribution	1,983,678	2,065,591	2,264,223
Employer Contribution as a Percent of Pay	8.80%	8.61%	9.44%

* The mortality table assumption was changed as shown in the Actuarial Assumptions section.

Valuation Results

A summary of the results of the actuarial valuations performed as of January 1, 2016 and January 1, 2018 is displayed below:

	January 1, 2016	January 1, 2018	
		Before Assumption Changes	After Assumption Changes*
Unfunded Accrued Liability			
Accrued Liability	$47,305,934	$53,302,671	$55,125,381
Less: Plan Assets	33,595,512	40,879,777	40,879,777
Unfunded Accrued Liability	$13,710,422	$12,422,894	$14,245,604
Ratio of Assets to Accrued Liability	71%	77%	74%
Annual Normal Cost			
Retirement, Death, Termination and Deferred Disability Benefits	$1,546,883	$1,699,436	$1,751,893
Administrative Expense Load	24,209	29,476	29,476
Total	$1,571,092	$1,728,912	$1,781,369

*   The mortality table assumption was changed as shown in the Actuarial Assumptions section.

5

Plan Assets

All future plan benefits will be derived from plan assets on the valuation date, future contributions and investment income on these amounts. The changes in the value of plan assets since the last valuation and the value of plan assets on the current valuation date are displayed below.

Changes in Value of Plan Assets

Market Value of Assets on January 1, 2016	$33,595,512
Contribution Receivable	0
Adjusted Plan Assets on January 1, 2016	$33,595,512
Employer Contributions	2,065,502
Employee Contributions	718,222
Investment Income	2,326,078
Monthly Benefit Payments	(2,095,874)
Lump Sum Distributions	(292,412)
Administrative Charges	(29,498)
Market Value of Assets on January 1, 2017	$36,287,530
Contribution Receivable	0
Adjusted Plan Assets on January 1, 2017	$36,287,530
Employer Contributions.	2,237,304
Employee Contributions	662,733
Investment Income	4,281,306
Monthly Benefit Payments	(2,364,047)
Lump Sum Distributions	(195,573)
Administrative Charges	(29,476)
Market Value of Assets on January 1, 2018	$40,879,777
Contribution Receivable	0
Adjusted Plan Assets on January 1, 2018	$40,879,777

Asset Allocation

Employee Funds - Annuity Contract	$4,101,486
Employee Funds - Equities	6,533,193
Employer Funds - Annuity Contract	10,171,347
Employer Funds - Equities	20,073,751
	$40,879,777

Plan Financial Information

Another objective of preparing the actuarial valuation is to evaluate the funding status of the Plan. The following display compares the funding status of the Plan for the two most recent actuarial valuations.

	January 1, 2016	January 1, 2018
1. Actuarial Present Value of Vested Accrued Benefits		
Retirees and Beneficiaries of Deceased Participants	$17,757,931	$23,305,137
Vested Terminated Participants	1,695,034	1,817,677
Active Participants	24,068,245	25,719,922
Total	$43,521,210	$50,842,736
2. Actuarial Present Value of Non-Vested Accrued Benefits for Active Participants	$865,778	$1,060,042
3. Actuarial Present Value of Accrued Benefits (1) + (2)	$44,386,988	$51,902,778
4. Value of Assets	$33,595,512	$40,879,777
5. Funded Ratio*		
Vested Accrued Benefits	77%	80%
Accrued Benefits	76%	79%
Interest Rate	7.00%	7.00%

The actuarial present value of vested and non-vested benefits has been determined based on the actuarial assumptions shown in the Actuarial Assumptions section.

*   Ratio of plan assets to applicable actuarial present value.

Actuarial Cost Method

Annual costs were calculated using the Projected Unit Credit Actuarial Cost Method. Projected Unit Credit is one of the Accrued Benefit Actuarial Cost Methods. Using Projected Unit Credit, annual costs equal the sum of the normal cost and an amount to amortize the unfunded accrued liability. The normal cost is defined as the actuarial value of retirement and ancillary benefits that are allocated to the current year.

The unfunded accrued liability is equal to the accrued liability reduced by the actuarial value of plan assets. The accrued liability is defined as the actuarial value of retirement and ancillary benefits that have been allocated to years of service prior to the current year.

The method allocates an equal amount of a participant's projected retirement benefit to each year of service. The benefit at normal retirement is projected assuming salaries increase at the assumed rates. The projected retirement benefit is then divided by the participant's years of service to determine the portion of the retirement benefit allocated to each year.

At the end of each year, a determination of actuarial gains and losses is made. Actuarial gains and losses indicate the extent to which actual experience is deviating from that expected on the basis of the actuarial assumptions. Actuarial gains result from experience more favorable than assumed and reduce the unfunded accrued liability. Actuarial losses result from experience less favorable than assumed and increase the unfunded accrued liability. All actuarial gains and losses are included in the determination of the unfunded accrued liability as of the valuation date.

The unfunded actuarial accrued liability is amortized over 25 years on a fixed level dollar, closed layered basis. This amortization method was adopted effective January 1, 2018.

Asset Valuation Method

The value of plan assets is based on the contract value of assets held at United of Omaha and the market value of assets held at American Funds and Stichler Wealth Management.

Actuarial Assumptions

Interest Rate

7.0% compounded annually.

Salary Scale

Salaries were assumed to increase at an annual rate of 2.5% compounded annually following the valuation date.

Mortality Rates

The mortality rates are based on the static IRS 2018 annuitant-distinct mortality table based on the RP 2014 table.

Turnover Rates

Based on years of service and age as follows:

Years of Service	Annual Rate
0	54.0%
1	25.5%
2	15.0%
3 or more	150% of Scale T-7 of the Actuary's Pension Handbook

Elected Form of Distribution

	Percent Electing	
Age	**Deferred Annuity**	**Employee Contribution**
Under 55	25%	75%
55 and over	100%	0%

Retirement Rate

Participants are assumed to retire in accordance with the following schedule:

Normal Retirement Age	Annual Rate of Retirement
62 with 30 years	15%
63 with 30 years	5%
64 with 30 years	5%
65	100%

Normal Retirement Age

Age 65 or Age 62 with 30 years of service earned as of the valuation date.

Actuarial Assumptions
(continued)

Marriage Rate

75% of the participants were assumed to be married at retirement. Female spouses are assumed to be 3 years younger than male spouses.

Administrative Expenses

Equal to prior plan year actual expense.

Summary of Plan Provisions

Effective Date   January 1, 1982.

Plan Year   January 1 through December 31.

Participation   Full-time employees are eligible to participate on January 1 or July 1 coinciding with or next following the completion of 6 months of service.

Definitions

Service   Any period of time the Employee is in the employ of the Employer as a full-time Employee.

Year of Service   A consecutive 12 month period during which 2,000 hours of service has been completed. For purposes of retirement benefits, a Year of Service shall include the fractional portion of the year from the most recent employment anniversary to date of termination.

Average Monthly Compensation   Average of monthly compensation during the five consecutive years of the last ten years of service which produces the highest average.

Normal Retirement Date   First day of the month coinciding with or next following the attainment of age 65, or age 62 with 30 years of service.

Early Retirement Date   First day of any month following the attainment of age 55 and completion of 10 years of service, or age 60 and 5 years of service.

Late Retirement Date   Anytime following Normal Retirement Date.

Disability Retirement   If a participant has completed five years of service and becomes disabled, they will remain active in the plan until their Normal Retirement Date. Mandatory employee contributions will be waived.

Summary of Plan Provisions
(continued)

Benefits

Normal Retirement

Monthly annuity equal to 1.75% of Average Monthly Compensation multiplied by the number of Years of Service.

Early Retirement

Monthly annuity computed in the same manner as the Normal Retirement Benefit but based on the service and Average Monthly Compensation as of the Early Retirement Date and reduced by 0.25% for each full month that the Early Retirement Date precedes the Normal Retirement Date.

Late Retirement

Monthly annuity computed in the same manner as the Normal Retirement Benefit but based on the service and Average Monthly Compensation earned as of the Late Retirement Date.

Disability

Monthly annuity payable at Normal Retirement Age computed in the same manner as the Normal Retirement Benefit assuming that compensation as of the date of Disability and service continued to the Normal Retirement Date.

Preretirement Death Benefit

A benefit is payable at the death of an active participant.

Death Prior to Early Retirement Date - A lump sum equal to the participant's contributions plus accumulated interest is payable to a designated beneficiary.

Death After Early Retirement Date - A monthly income payable to a surviving spouse or dependent children equal to 60% of the earned benefit determined at the participant's death. This amount is payable beginning at the participant's Normal Retirement Date. A reduced monthly income may be selected by the surviving spouse or the dependent children to be payable beginning at any date following the participant's Early Retirement Date. The monthly income is payable for the life of the surviving spouse. If paid to the dependent children, the monthly income will continue until the youngest child attains age 21.

If the participant is not survived by an eligible spouse or dependent children a lump sum equal to the participant's contributions plus accumulated interest is payable to a designated beneficiary.

Summary of Plan Provisions
(continued)

Termination Benefit

Benefit upon termination equal to a vested interest in the earned pension as of the date of termination determined according to the following schedule:

Years of Service	Vesting %
Less than 5 years	0%
5	50%
6	60%
7	70%
8	80%
9	90%
10 or more years	100%

Normal Forms of Annuity

Married Participant

Joint and 60% Survivor annuity.

Single Participant

Five Year Certain & Life annuity.

Contributions

Participant

A monthly amount equal to 2.75% of monthly compensation. The contributions are picked up by the employer effective July 1, 2013.

Employer

An amount necessary to provide the benefits under the plan based upon the recommendations of periodic actuarial valuations. Currently, the employer has scheduled the following contribution rates as a percentage of payroll:

2010	5.5%
2011	6.0%
2012	6.5%
2013	7.0%
2014	7.5%
2015	8.0%
2016	8.5%
2017	9.0%
2018	9.5%

Participant Census Statistics

January 1, 2018

Active Participants Included in Valuation

Age at Valuation Date	Years of Service								Total	Average Salary
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+		
Under 20	0	0	0	0	0	0	0	0	0	0
20-24	32	1	0	0	0	0	0	0	33	31,986
25-29	53	19	1	0	0	0	0	0	73	32,406
30-34	49	26	9	1	0	0	0	0	85	33,158
35-39	25	19	12	19	0	0	0	0	75	36,027
40-44	20	9	12	12	6	0	0	0	59	37,209
45-49	21	11	8	6	11	2	0	0	59	37,965
50-54	23	6	5	12	13	4	2	0	65	38,606
55-59	19	15	20	12	10	7	8	1	92	41,211
60-64	15	10	10	16	13	9	7	11	91	40,706
65 & Over	6	10	6	2	2	1	1	8	36	40,737
Total	263	126	83	80	55	23	18	20	668	
Average Salary	34,209	35,482	36,329	38,571	39,014	45,819	48,214	60,602		37,198

Average Salary - based on reported compensation for calendar 2017.

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Participant Census Statistics
(continued)

January 1, 2018
Non-Active Participants Included in Valuation

	Number	Total Annual Benefit	Average Annual Benefit
Retired & Beneficiary	251	$2,417,240	$9,630
Vested Terminated	76	428,122	5,633
Total	327	2,845,362	8,701

Retired & Beneficiary Participants in Pay Status

Age	Number	Total Annual Benefit	Average Annual Benefit
Under 55	1	$9,468	$9,468
55-59	9	76,891	8,543
60-64	24	272,737	11,364
65-69	67	787,743	11,757
70-74	57	616,969	10,824
75-79	43	308,943	7,185
80-84	23	164,464	7,151
85-89	19	141,002	7,421
Over 89	8	39,023	4,878
Total	251	2,417,240	9,630

Participant Census Statistics
(continued)

	Active	Non-Active		Total
		Deferred	**Retired**	
Number on January 1, 2016	678	77	216	971
Terminated				
Non-Vested	-17	0	0	-17
Vested - Lump Sum	-80	-11	0	-91
Vested - Deferred	-20	+20	0	0
Deceased				
Vested - Lump Sum	-2	0	0	-2
Vested - Beneficiary	-1	-1	-4	-6
No Additional Benefit	0	-1	-5	-6
Retired				
Monthly Benefit	-37	-5	+42	0
Lump Sum	0	0	0	0
Certain Period Expired	0	0	-4	-4
Beneficiary	0	0	+6	+6
Return to Active	+3	-3	0	0
New Entrants or Prior Omissions During Plan Year	+144	0	0	+144
Number on January 1, 2018	668	76	251	995

Non-Active Participants	**Number**	**Annual Benefit**
Deferred Participants	76	$2,417,240
Retired & Beneficiary Participants	251	$428,122

EASTERN NEBRASKA HUMAN SERVICES AGENCY EMPLOYEES RETIREMENT PLAN

Actuarial Experience Review

July 5, 2016

July 5, 2016

PERSONAL AND CONFIDENTIAL

Mr. Bob Brinker
Eastern Nebraska Human Services Agency
900 South 74th Plaza, Suite 200
Omaha, NE 68114

RE: Actuarial Experience Review

Dear Bob:

Enclosed are 15 copies of the Actuarial Experience Review. This report summarizes salary, turnover, benefit election and investment return experience of the Employees Retirement Plan. Mortality experience is also briefly addressed.

After the assumptions are confirmed, our next step is to proceed with completion of the actuarial valuation. Please call to discuss, or we would be happy to meet at your convenience.

Sincerely,

Renee A. Nolte, ASA, MAAA
Senior Consultant

RAN/ck

Enclosures

Table of Contents

Discussion of Results

SilverStone Group has conducted an actuarial study of the salary, turnover, benefit election and investment return experience for the Eastern Nebraska Human Services Agency (ENHSA) Employees Retirement Plan (Plan). The study includes data from the 2012 through 2015 plan years. In addition, the results from previous studies conducted on the 2006 through 2011 plan years have been included for comparison.

Experience has been analyzed on annual periods based on the census and asset data provided by ENHSA. An analysis of experience involves:
- Calculation of actual rates of increase (decrease).
- Calculation of expected rates of increase (decrease).
- Comparison of the actual rates to the expected rates (i.e., on absolute terms).
- Comparison of the actual rates divided by the expected rates (i.e., on relative terms).

Salary Experience
The salary change rate was calculated two ways. First, salaries were compared in the aggregate from one year to the next for the last 10 years. This comparison often forms the basis of the assumed rate of salary increase used in an actuarial valuation. These historical annual salary increases were then compared to the current assumed salary rate of 2.0%. Salary rates over the last three years were also analyzed by five-year age brackets.

Experience indicates that an increase in the salary rate assumption may be considered. The average over the last 10 years is 2.99%; the average over the last five years is 2.69%. The salary rate assumption was decreased from 4.0% to 2.0% effective with the 2012 valuation. Increasing the assumed salary rate slightly to 2.50% would seem reasonable.

Turnover Experience
The current turnover assumption consists of rates that vary by age and service. The turnover rates do not depend on age during the first three years of service. After three years of service, the rates are a function of age only.

Because the turnover rate is dependent upon both years of service and age, the turnover rate was calculated two ways. First, turnover rates were calculated for employees who have less than three years of service with ENHSA. Second, employees were grouped in five-year age brackets. The turnover rate was calculated based on the number of employees in each age group ending their employment with ENHSA.

The turnover rate assumption was reduced 25% in 2006. The experience from 2010 through 2015 shows that overall, actual turnover experience remains slightly below expected. Each year, the actual turnover rate increased closer to the expected rates. (77% for 2010 – 2011; 85% for 2012 – 2013 and 93% for 2014 – 2015)

The graphs on pages 7 and 8 analyze turnover by years of service. The graphs on pages 9 and 10 analyze turnover by five-year age brackets. For the most recent experience, the largest variances from expected are for years of service less than 1 (56% of expected) and for age 65 and over (36% of expected). Experience was similar for these segments over the prior two periods. In addition, the age group from 55 to 59 has experienced turnover 52% higher than expected with similar experience over the prior two periods.

For turnovers with less than one year of service, our test results may be lower than actual since our data does not track a new hire and termination that occurs within the same plan year, only those that cross over to the next plan year.

A turnover/retirement age assumption beyond age 65 would be atypical for this size and type of plan. An increase to the turnover rate assumption for early retirement beginning at age 55 would be justified, but this would cause the overall turnover rate assumption to be even higher than the actual experience. Therefore, we suggest no change to the assumed turnover rates.

Form of Benefit Election Experience
For those participants who terminated with a vested deferred annuity option, actual experience was tabulated to determine the percent who elected to forego the annuity option and elect return of their contributions plus interest.

Actual experience for the most recent two-year periods has been both above and below the expectation that 75% of those under age 55 elect return of contributions (81% elected a return of contributions in 2012 – 2013 and 60% in 2014 – 2015). For those 55 and over, there were two participants who elected a return of contributions in the 2012 – 2013 period and no participants made this election in the 2014 – 2015 period. The assumption for this age group is that no participants will elect the return of contributions. Therefore, we suggest no change to the current assumption.

Investment Return Experience
The investment return rate was calculated on a simplified basis that assumes cash flow occurs evenly throughout each year. Use of a simplified basis is supported by the fact employee and ENHSA contributions are made bi-monthly. For this reason, the calculated rate may not agree with rates of return reported by United of Omaha.

The investment return rate has averaged 4.8% on a compound basis over the 10-year period from 2006 through 2015. For the five-year period from 2011 through 2015, the average return rate is 6.3%. The investment return rate exceeded the 7% assumption during 4 of the 10 years displayed. The rate of investment return assumption has been 7.0% since prior to 1997. Considering the investment mix of equities and fixed income, 7.0% remains an acceptable assumption.

Mortality Experience
The number of participants in this Plan is not large enough to rely on actual mortality experience. However, it may be helpful to note that there were 16 total deaths over the 2012 to 2015 plan years (seven in 2012 – 2013 and nine in 2014 – 2015). Based on the mortality table in effect for the 2016 plan year (IRS 2016 annuitant-distinct mortality table), 6.2 total deaths are expected over the same years. Our test data for this experience review only includes active employees. Results would be different if we were to include retiree deaths. However, the actual mortality experience would indicate that the recent table released by the Society of Actuaries late last year (RP 2014 with MP 2015 generational improvement) would not be more appropriate for this Plan since it would result in assuming fewer deaths than the static IRS 2016 mortality table.

Salary Experience from 2006 to 2015
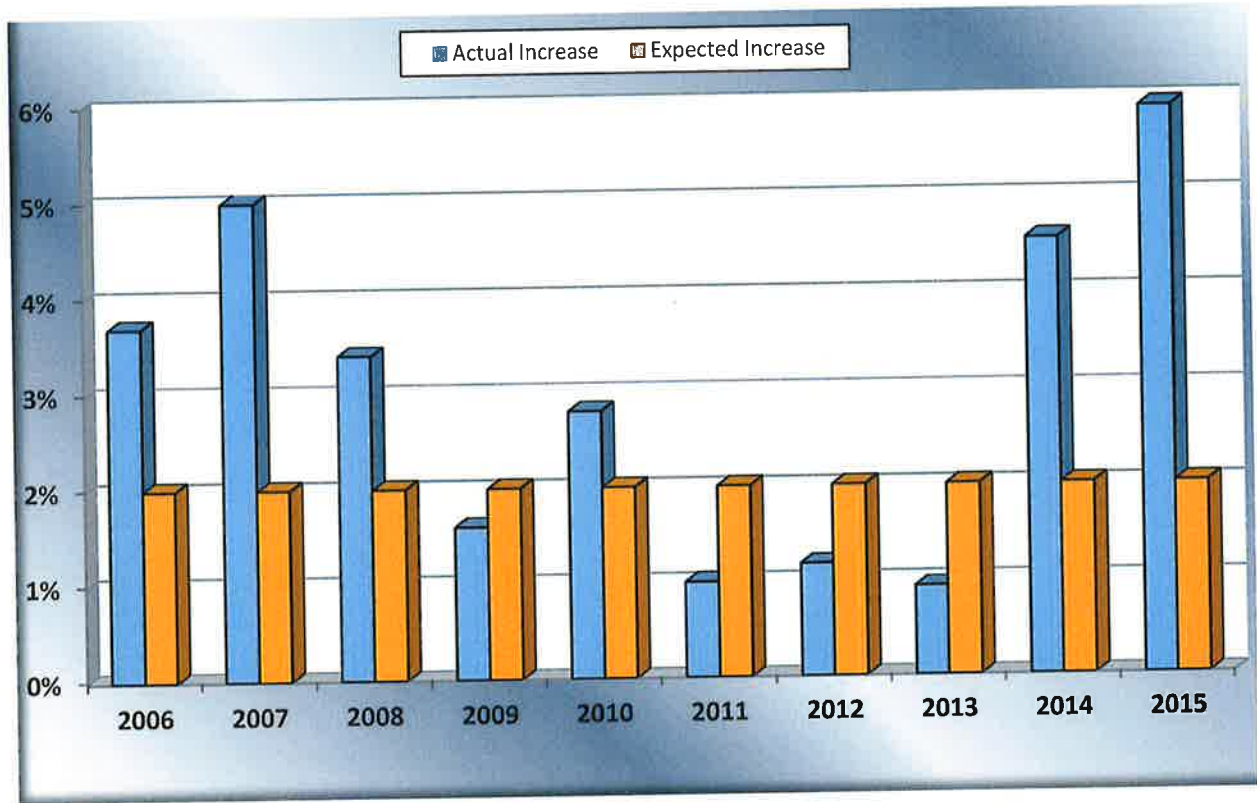
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Increase	3.7%	5.0%	3.4%	1.6%	2.8%	1.0%	1.2%	0.9%	4.6%	5.9%
Expected Increase	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

Salary Experience from 2006 to 2015
Ratio of Actual vs. Expected Salary Increase
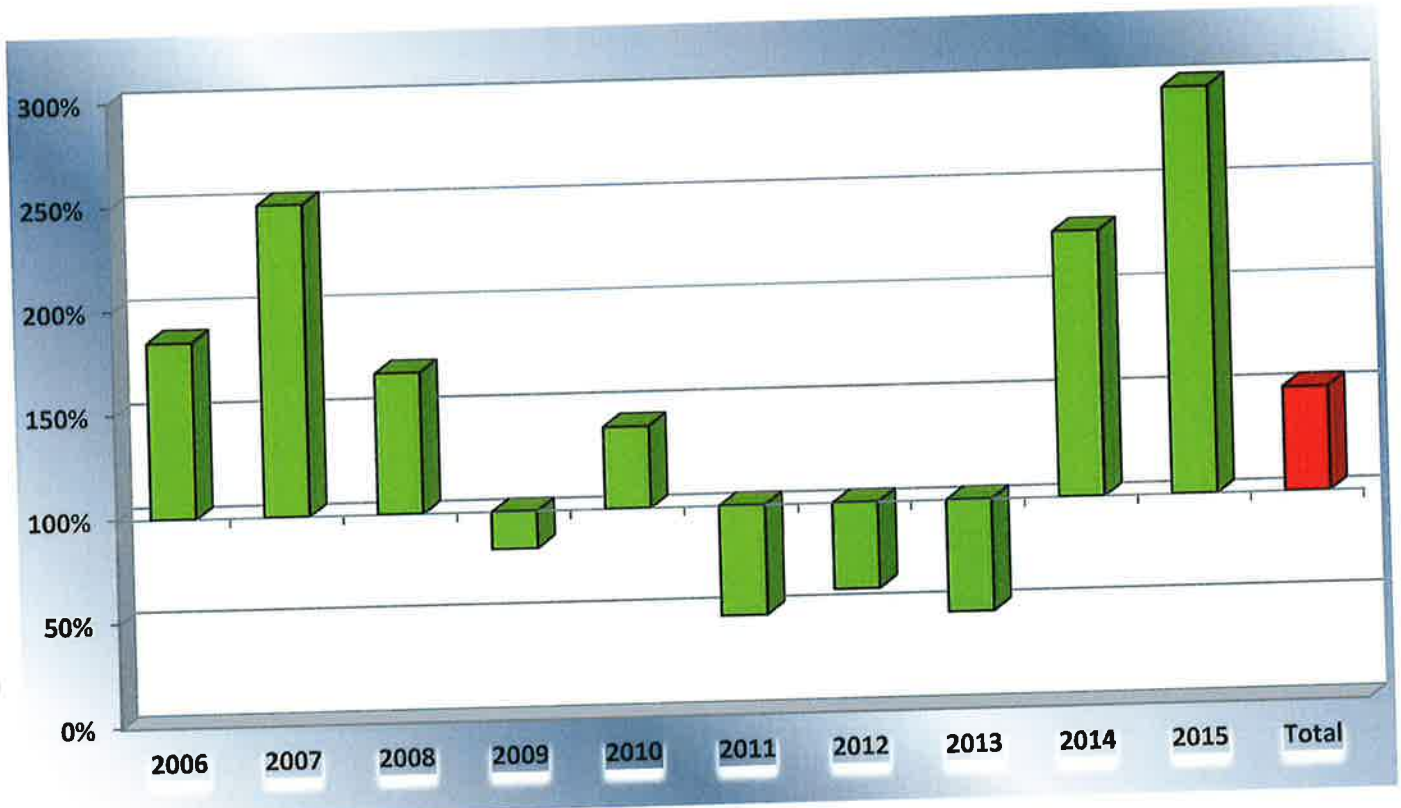
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Actual Increase	3.7%	5.0%	3.4%	1.6%	2.8%	1.0%	1.2%	0.9%	4.6%	5.9%	3.0%
Expected Increase	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Actual vs. Expected	185.0%	250.0%	168.0%	82.3%	139.5%	47.5%	58.8%	46.5%	227.7%	295.8%	150.1%

Salary Experience from 2013 to 2015
## Ratio of Actual to Expected Salary Increase by Age Group
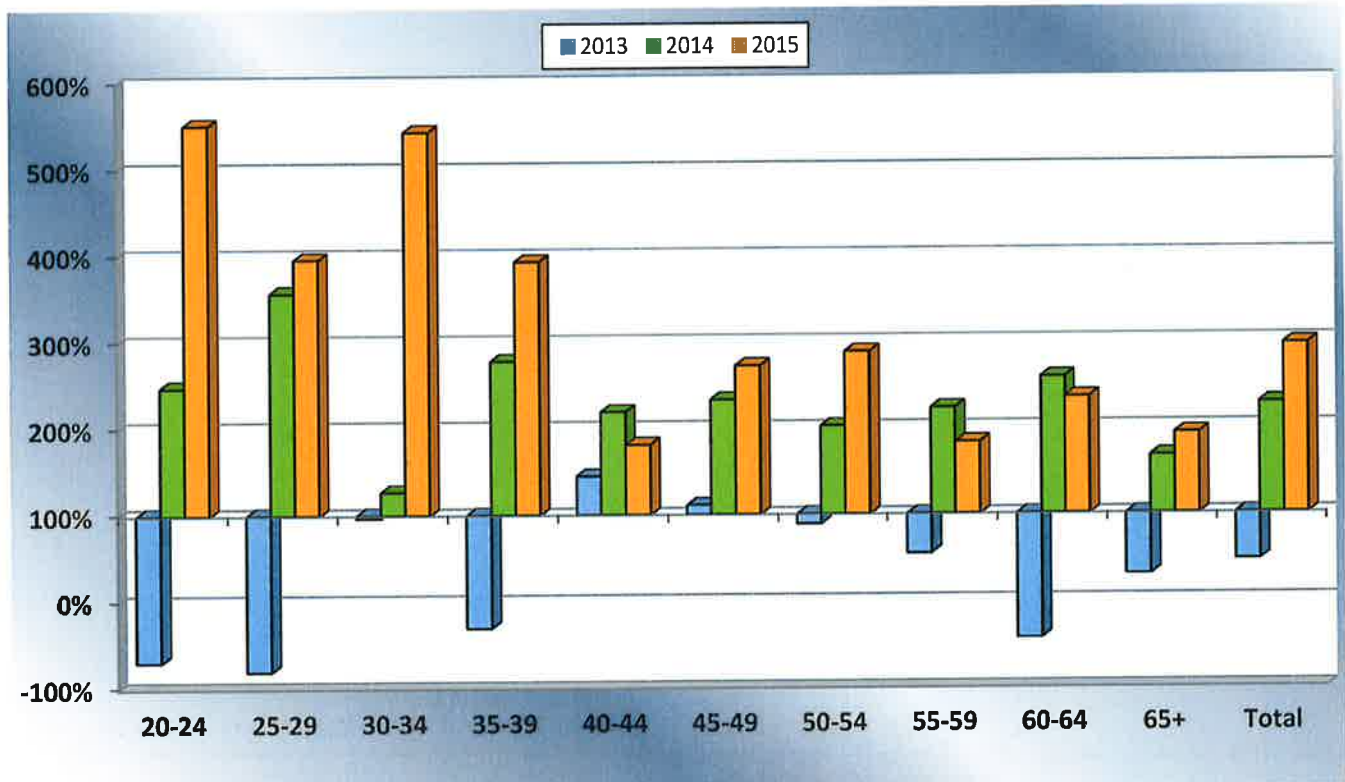
Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total

Actual Increase vs. Expected Increase

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
2013	-69%	-80%	97%	-30%	145%	111%	89%	55%	-43%	30%	47%
2014	248%	357%	127%	278%	219%	233%	202%	223%	258%	167%	228%
2015	551%	396%	543%	393%	181%	272%	288%	183%	235%	193%	296%

Turnover Experience from 2010 to 2015
Ratio of Actual to Expected Turnover
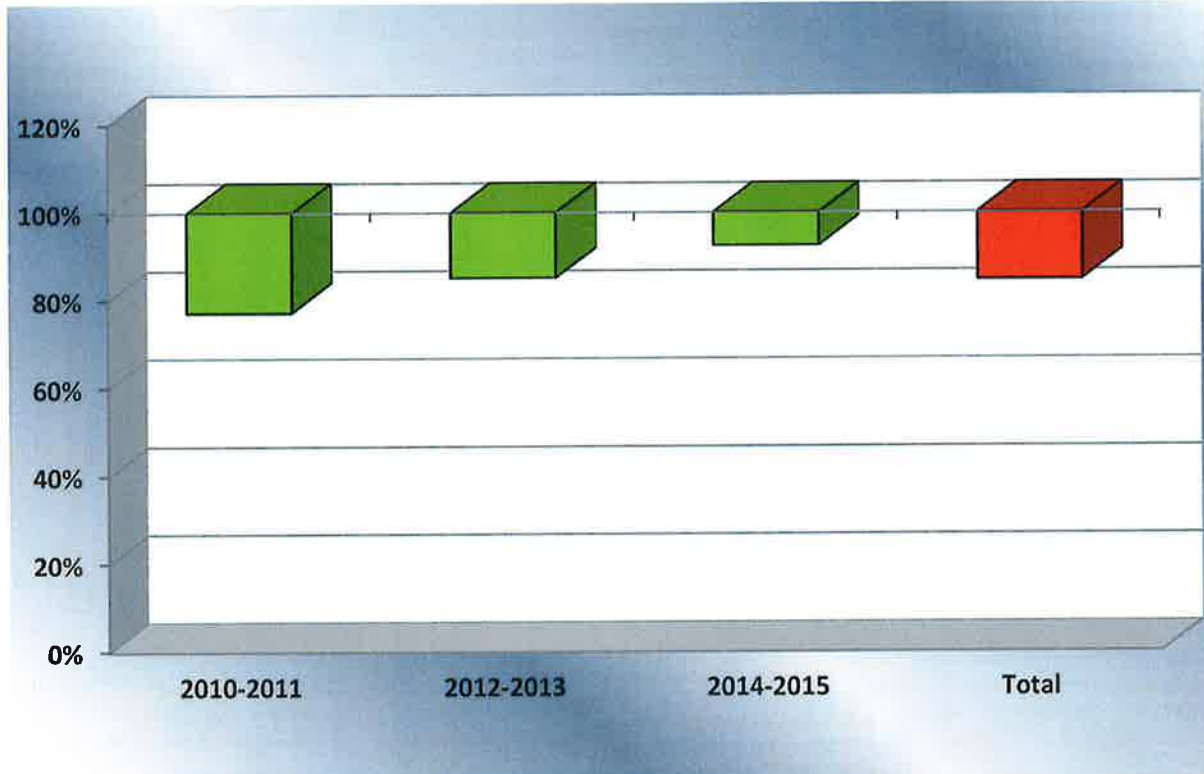
Year	2010-2011	2012-2013	2014-2015	Total
Actual Turnover	157	170	165	492
Expected Turnover	203	200	178	581
Actual vs. Expected	77%	85%	93%	85%

Turnover Experience for 2014 and 2015
Ratio of Actual to Expected Turnover by Years of Service
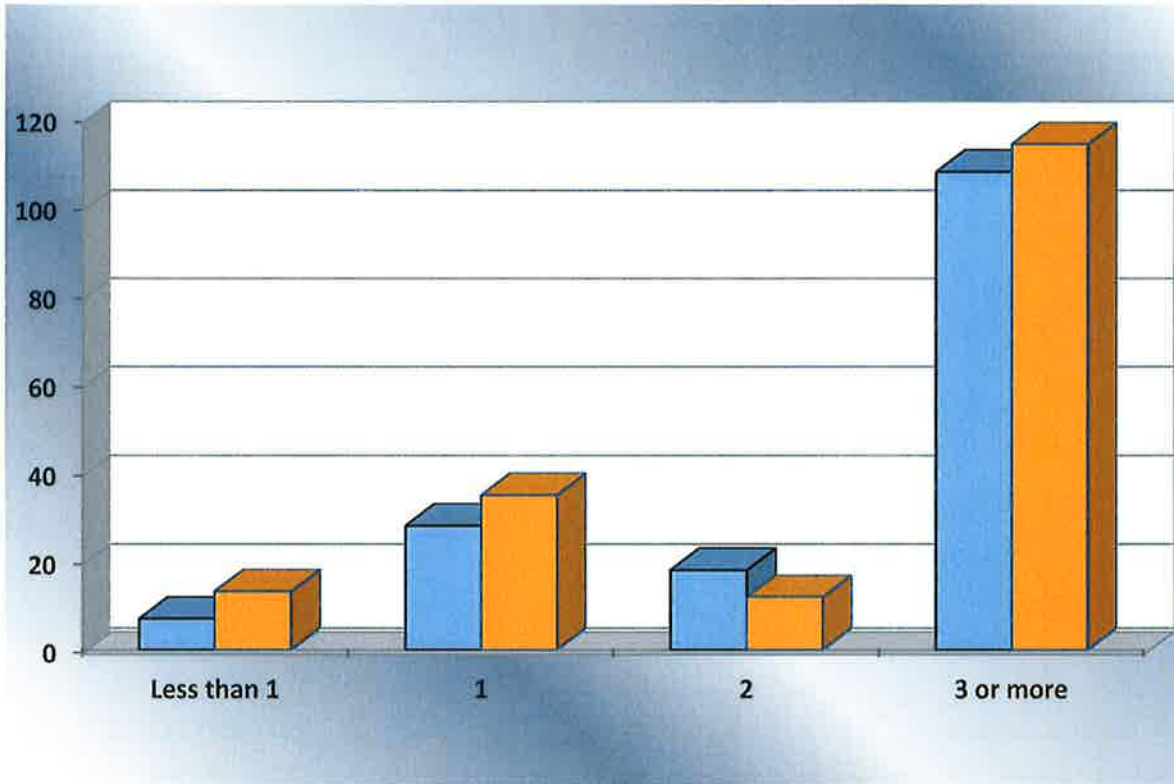
Years of Service	Less than 1	1	2	3 or more	Total
Actual Turnover	8	29	19	109	165
Expected Turnover	14	36	13	115	178
Actual vs. Expected	56%	81%	147%	95%	93%

Turnover Experience from 2010 to 2015
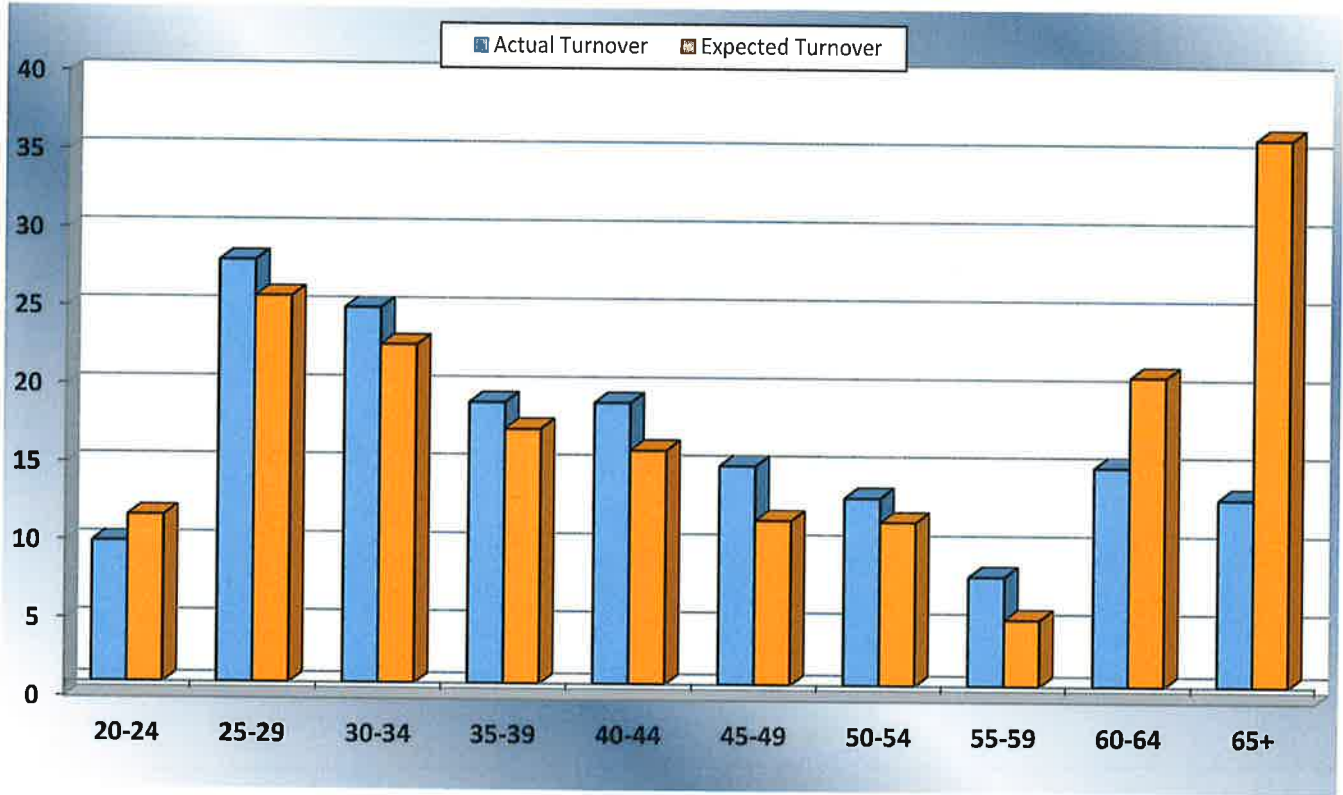# Ratio of Actual to Expected Turnover by Years of Service

Years of Service	Less than 1	1	2	3 or more	Total
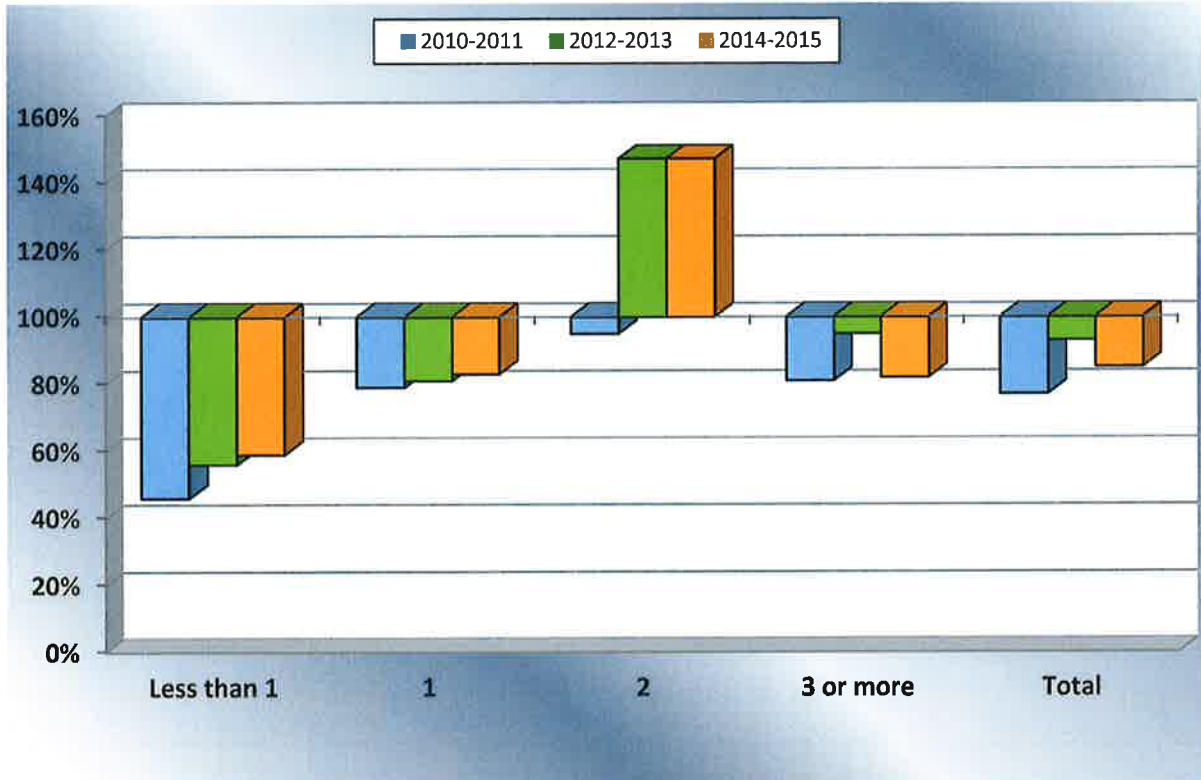
Actual Turnover vs. Expected Turnover

	Less than 1	1	2	3 or more	Total
2010-2011	46%	79%	95%	81%	77%
2012-2013	59%	83%	147%	82%	85%
2014-2015	56%	81%	147%	95%	93%

Turnover Experience for 2014 and 2015
Incidence of Turnover by Age Group

Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Actual Turnover	10	28	25	19	19	15	13	8	15	13	165
Expected Turnover	12	26	23	17	16	12	11	5	21	36	178

Turnover Experience from 2010 to 2015
Ratio of Actual to Expected Turnover by Age Group
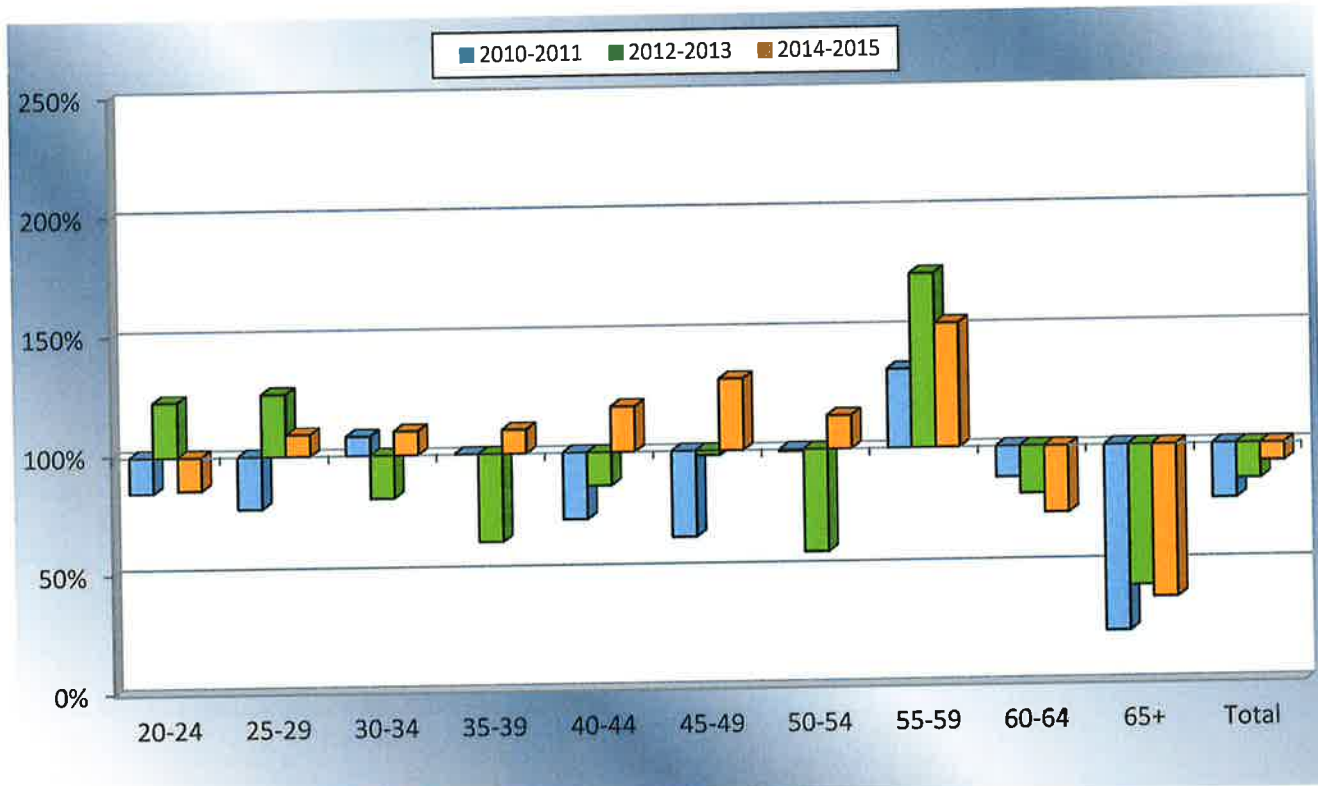
Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total

Actual Turnover vs. Expected Turnover

|	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
2010-2011	85%	78%	108%	100%	72%	64%	99%	133%	87%	22%	77%
2012-2013	123%	126%	82%	63%	86%	98%	57%	173%	80%	41%	85%
2014-2015	86%	109%	110%	110%	119%	130%	114%	152%	72%	36%	93%

Benefit Election Experience for 2014 and 2015
Incidence of Election to Return Contributions
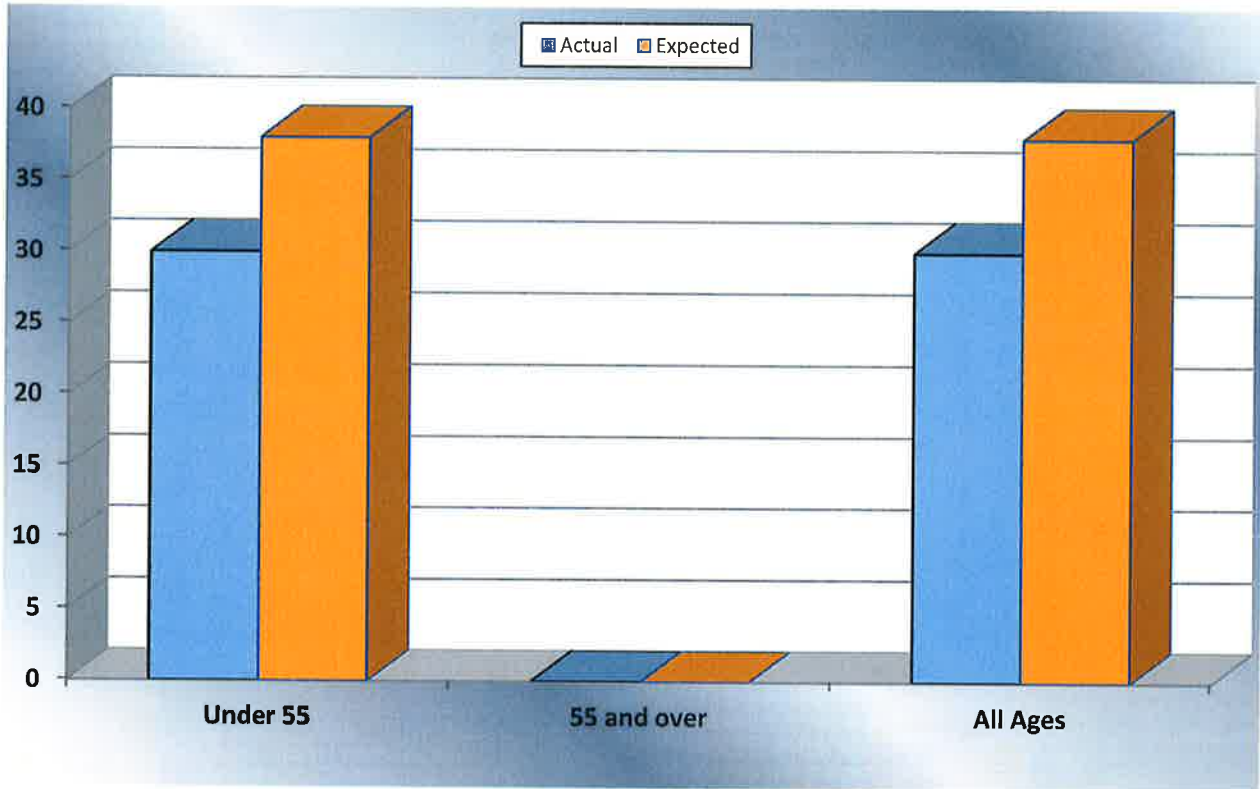
Age	Under 55	55 and over	All Ages
Number Electing Return of Contributions*			
Actual	30	0	30
Expected	38	0	38
Actual vs. Expected	79%	N/A	79%

* Excludes those withdrawing before the opportunity to vest in a deferred annuity.
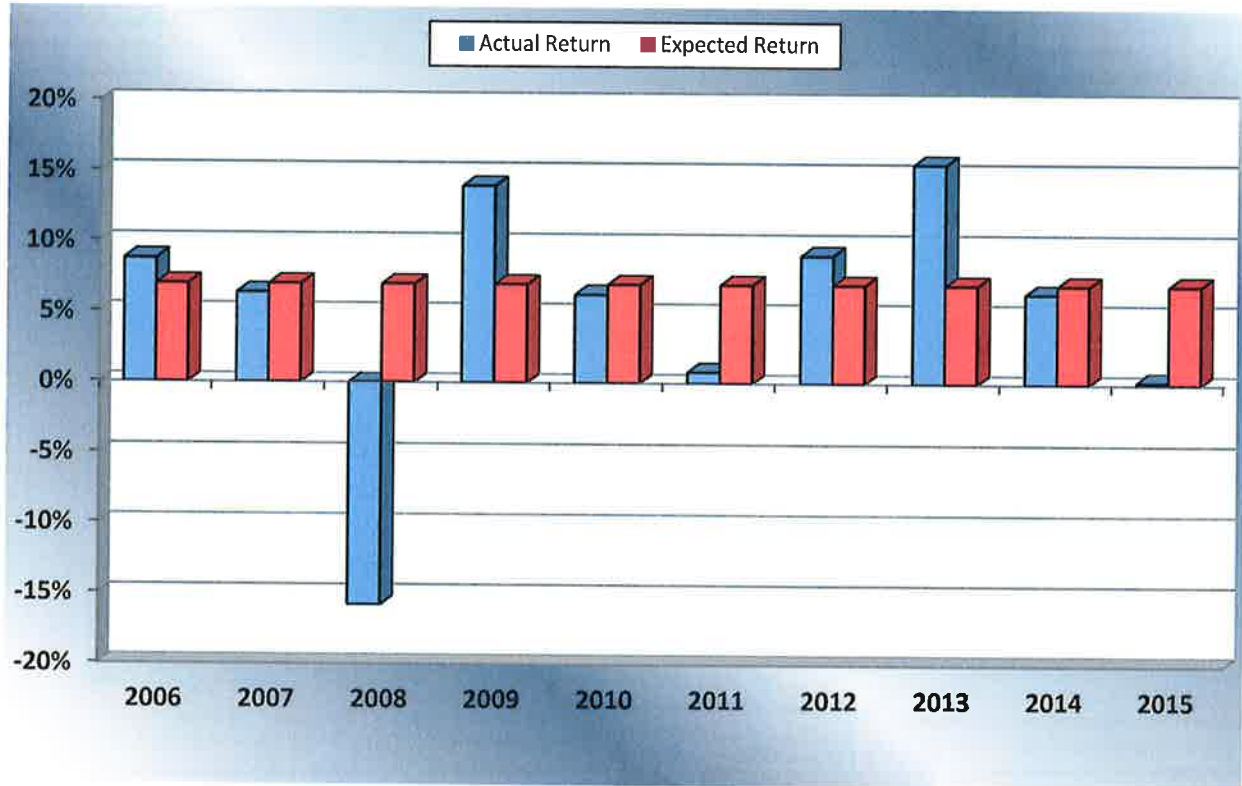
Benefit Election Experience from 2010 to 2015
Percent Electing Return of Contributions
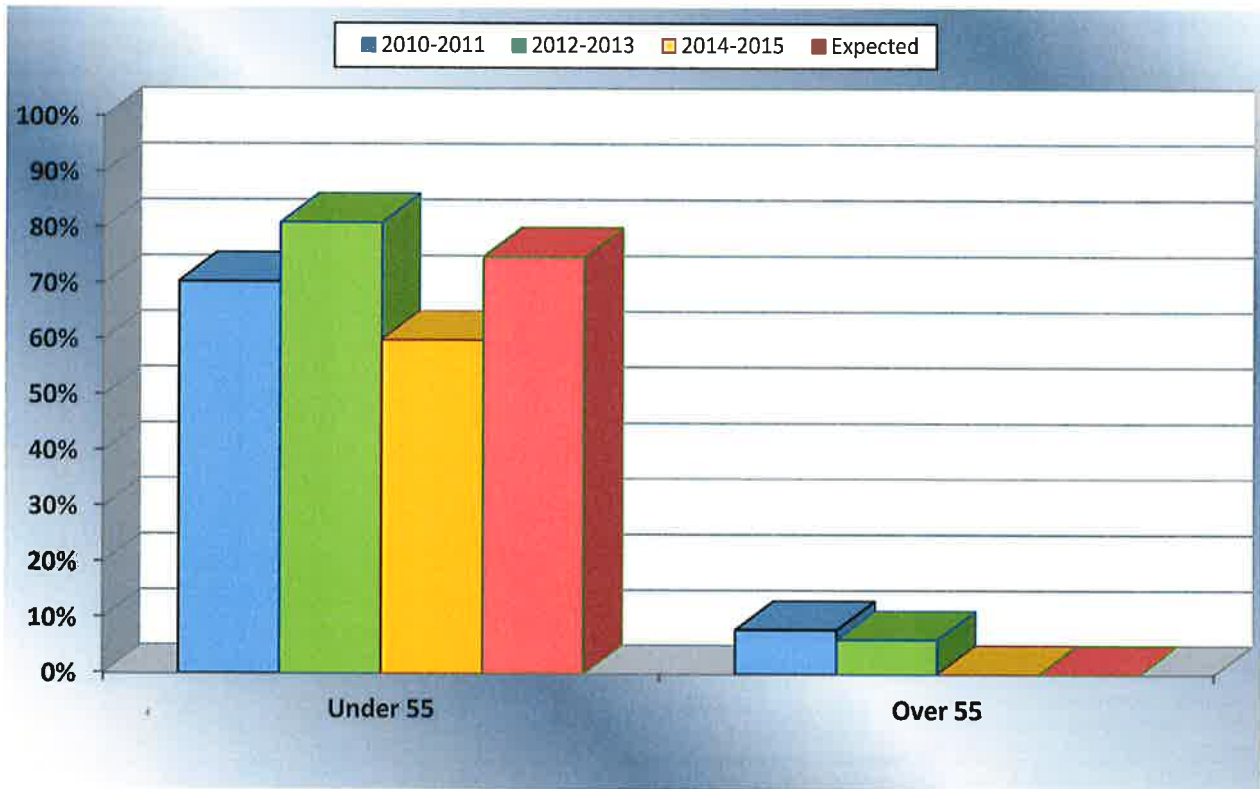
Age	Under 55	Over 55	All Ages
Percent Electing Return of Contributions*			
2010-2011	70%	8%	53%
2012-2013	81%	6%	46%
2014-2015	60%	0%	38%
Expected	75%	0%	N/A

* Excludes those withdrawing before the opportunity to vest in a deferred annuity.

Investment Experience from 2006 to 2015

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Return	8.8%	6.4%	-15.8%	14.0%	6.3%	0.8%	9.1%	15.6%	6.4%	0.2%
Expected Return	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%

Actuarial Assumptions

The actuarial assumptions included in the experience study are summarized below:

Salary Increase Rate   2.0% compounded annually

Turnover Rates   Rates in the first three years are:

Years of Service	Rate
0	54.0%
1	25.5
2	15.0

After three years, sample rates are as follows:

Age	Rate
25	14.5%
30	14.0
35	13.1
40	11.6
45	9.5
50	6.3
55	2.3
60	0.2

Elected Form of Distribution

Under Age 55	75% Return of Contribution 25% Deferred Annuity
Over age 55	100% Deferred Annuity

Retirement Rates

Age	Rate
62	15%
63	5%
64	5%
65+	100%

Investment Return Rate   7.0% compounded annually

Salary Experience Analysis from 2014 to 2015 [3]

Age Group	2014 Salary	2015 Salary	Actual Increase [1]	Expected Increase [2]	Actual/ Expected
20-24	27,735	30,791	11.02%	2.00%	551%
25-29	29,564	31,908	7.93%	2.00%	396%
30-34	30,201	33,479	10.86%	2.00%	543%
35-39	33,115	35,718	7.86%	2.00%	393%
40-44	38,097	39,476	3.62%	2.00%	181%
45-49	36,231	38,199	5.43%	2.00%	272%
50-54	37,808	39,985	5.76%	2.00%	288%
55-59	37,601	38,976	3.66%	2.00%	183%
60-64	38,203	39,995	4.69%	2.00%	235%
65+	36,641	38,058	3.87%	2.00%	193%
Total	35,221	37,304	5.92%	2.00%	296%

Salary Experience Analysis from 2013 to 2014 [3]

Age Group	2013 Salary	2014 Salary	Actual Increase [1]	Expected Increase [2]	Actual/ Expected
20-24	26,424	27,735	4.96%	2.00%	248%
25-29	27,592	29,564	7.15%	2.00%	357%
30-34	29,452	30,201	2.54%	2.00%	127%
35-39	31,370	33,115	5.56%	2.00%	278%
40-44	36,500	38,097	4.37%	2.00%	219%
45-49	34,619	36,231	4.66%	2.00%	233%
50-54	36,340	37,808	4.04%	2.00%	202%
55-59	35,996	37,601	4.46%	2.00%	223%
60-64	36,329	38,203	5.16%	2.00%	258%
65+	35,457	36,641	3.34%	2.00%	167%
Total	33,687	35,221	4.55%	2.00%	228%

[1] The percentage is based on the aggregate amounts.
[2] Rate used in actuarial valuations since 2012.
[3] Results derived from 2016 valuation census.

Salary Experience Analysis from 2012 to 2013 [3]

Age Group	2012 Salary	2013 Salary	Actual Increase [1]	Expected Increase [2]	Actual/ Expected
20-24	25,775	25,421	-1.37%	2.00%	-69%
25-29	29,197	28,728	-1.61%	2.00%	-80%
30-34	29,575	30,152	1.95%	2.00%	97%
35-39	33,729	33,526	-0.60%	2.00%	-30%
40-44	32,319	33,259	2.91%	2.00%	145%
45-49	32,895	33,624	2.22%	2.00%	111%
50-54	36,691	37,341	1.77%	2.00%	89%
55-59	36,600	37,006	1.11%	2.00%	55%
60-64	35,548	35,244	-0.86%	2.00%	-43%
65+	33,412	33,610	0.59%	2.00%	30%
Total	33,317	33,627	0.93%	2.00%	47%

Salary Experience Analysis from 2011 to 2012 [3]

Age Group	2011 Salary	2012 Salary	Actual Increase [1]	Expected Increase [2]	Actual/ Expected
20-24	27,264	25,775	-5.46%	2.00%	-273%
25-29	28,238	29,197	3.40%	2.00%	170%
30-34	29,327	29,575	0.85%	2.00%	42%
35-39	32,713	33,729	3.11%	2.00%	155%
40-44	31,784	32,319	1.68%	2.00%	84%
45-49	33,178	32,895	-0.85%	2.00%	-43%
50-54	36,315	36,691	1.03%	2.00%	52%
55-59	36,144	36,600	1.26%	2.00%	63%
60-64	34,817	35,548	2.10%	2.00%	105%
65+	33,376	33,412	0.11%	2.00%	5%
Total	32,930	33,317	1.18%	2.00%	59%

[1] The percentage is based on the aggregate amounts.
[2] Rate used in actuarial valuations since 2012.
[3] Results derived from 2014 valuation census.

Turnover and Early Retirement Experience

Turnover Experience for 2014 and 2015

Years of Service	Actual Turnover	Expected Turnover	Actual/ Expected
0	8	14	56%
1	29	36	81%
2	19	13	147%
3 or More	109	115	95%
Total	165	178	93%

Age Group	Actual Turnover	Expected Turnover	Actual/ Expected
20-24	10	12	86%
25-29	28	26	109%
30-34	25	23	110%
35-39	19	17	110%
40-44	19	16	119%
45-49	15	12	130%
50-54	13	11	114%
55-59	8	5	152%
60-64	15	21	72%
65+	13	36	36%
Total	165	178	93%

Early Retirement Experience for 2014 and 2015

Age Group	Actual Retirement	Expected Retirement	Actual/ Expected
61 and Under	4	1	381%
62	3	3	92%
63	3	1	220%
64	4	14	29%
65+	13	36	36%
Total	27	56	48%

Turnover and Early Retirement Experience
(continued)

Turnover Experience for 2012 and 2013

Years of Service	Actual Turnover	Expected Turnover	Actual/ Expected
0	15	25	59%
1	27	33	83%
2	26	18	147%
3 or More	102	124	82%
Total	170	200	85%

Age Group	Actual Turnover	Expected Turnover	Actual/ Expected
20-24	23	19	123%
25-29	38	30	126%
30-34	20	24	82%
35-39	12	19	63%
40-44	14	16	86%
45-49	14	14	98%
50-54	8	14	57%
55-59	11	6	173%
60-64	14	18	80%
65+	16	39	41%
Total	170	200	85%

Early Retirement Experience for 2012 and 2013

Age Group	Actual Retirement	Expected Retirement	Actual/ Expected
61 and Under	5	3	159%
62	1	2	43%
63	6	1	473%
64	2	10	20%
65+	14	39	36%
Total	28	56	50%

Benefit Election Experience

Elected Form of Distribution for 2014 and 2015

Age Group	Participants with Annuity Option	Number Electing Return of Contributions	Expected	Actual/ Expected	Percent Electing Return of Contributions	Percent Expected
Under 55	50	30	38	79%	60%	75%
55 and over	30	0	0	N/A	0%	0%
Total	80	30	38	79%	38%	48%

Elected Form of Distribution for 2012 and 2013

Age Group	Participants with Annuity Option	Number Electing Return of Contributions	Expected	Actual/ Expected	Percent Electing Return of Contributions	Percent Expected
Under 55	37	30	28	107%	81%	75%
55 and over	32	2	0	N/A	6%	0%
Total	69	32	28	114%	46%	41%

Appendix C

Metro Area Transit Hourly Employees Retirement Plan Information

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LB 759 REPORTING FORM (HOURLY PLAN)
Metro Area Transit Hourly Employees' Pension Plan

1. Plan Information for Years 2013 Through Current Plan Year 2018

		2013	2014	2015	2016	2017	2018
1a.	Funding Status	68%	76%	76%	72%	71%	77%
1b.	Assumed rate of return	7.00%	7.00%	7.00%	6.75%	6.75%	6.75%
1c.	Actual investment return	11.90%	14.20%	6.10%	-1.50%	5.80%	13.35%
1d.	Member and Employer contribution rates -- percentage	6.00% for Member, 6.50% Employer	6.00% for Member, 6.50% Employer	6.00% for Member, 5.50% Employer	6.00% for Member, 6.50% Employer	6.00% for Member, 6.50% Employer*	7.00% for Member, 7.50% Employer
1e.	Normal cost - percentage	7.02%	7.28%	7.39%	7.35%	7.39%	7.21%
1f.	Actuarially required contribution (ARC) - percentage & dollar amount	85.70% & $847,072	84.30% & $833,212	88.30% & $847,243	78.30% & $901,256	N/A & $958,333	N/A & $835,474
1g.	Actuarially required contribution (ARC) - actual dollars contributed & percentage of ARC actually contributed	$726,238 & 85.74%	$702,245 & 84.28%	$748,129 & 88.30%	$705,467 & 78.28%	N/A	N/A

* Employer contribution rate increased to 7.5% effective 9/1/2017 and employer made a onetime lump-sum contribution to the Plan equal to 1% of the total of the active Plan participants' compensation for the period beginning on July 1, 2016 and ending on August 31, 2017, making the effective employer contribution rate 7.5% since July 1, 2016.

2. Circumstances That Led to Under Funding the Plan:

In prior periods, investment returns did not meet the return assumptions. In addition, due to lower capital market expectations, the interest rates used to value liabilities have been decreased several times in the last nine years (see below) and by 25 basis points in the valuation for 2016, which was also the interest rate used for the 2017 valuation.

2009	reduced from 8% to 7.5%
2015	reduced from 7.5% to 7.0%
2016	reduced from 7.0% to 6.75%

3. Changes in Actuarial Methods/Assumptions:

The employer's contribution rate changed from 6.50% of all payroll to 7.50%. The employee's contribution rate changed from 6.00% of all payroll to 7.00%.

4. In what year is the plan's funding ratio expected to reach 100%?

The funding ratio was 71% in 2017 and 77% in 2018. If all actuarial assumptions hold, the plan will reach 100% funding ratio in a few years.

5. **What is the method used to amortize the unfunded actuarial liability?**

Unfunded actuarial liability is amortized for 30 years starting in 2012, graded down for each successive year. The Individual Entry Age Normal Cost is the actuarial cost method used to value the liabilities.

6. **Description of Corrective Actions Implemented to Improve the Funding Status of the Plan:**

The Hourly Pension Committee members have amended the plan document to increase the employer and employee contribution rates. The employer contribution rate increased from 6.5 % to 7.5%. The employee contribution rate increased from 6% to 7%. For those employees hired on or after January 1, 2018, the Pension Committee also (i) changed the normal retirement date from age 65 to the age when the employee reaches full retirement for purposes of receiving Social Security benefits, and (ii) eliminated the early retirement option. The benefit factor percentage used in the calculation of the monthly benefit for those employees hired on or after January 1, 2018, was also changed by the Pension Committee to a tiered structure based on years of service in lieu of the current method of using the same benefit factor percentage regardless of years of service. In addition, a one-time lump sum contribution was made to the Plan in an amount equal to 1% of the total of the active Plan participants' compensation for the period beginning on July 1, 2016 and ending on August 31, 2017, making the effective employer contribution rate 7.5% since July 1, 2016.. The Pension Committee believes all these changes will address the funding issue. The Pension Committee is comprised of bargaining unit employees, management representatives and a Metro Transit Board member. The actuarial assumptions are reviewed annually to give committee members a data regarding plan performance. The Committee meets a minimum of once per year to review plan performance, assumptions, asset allocations and potential plan changes. The interest rate (the assumed actuarial rate of return) used on the actuarial report remained the same in 2017 from 2016.

In addition, to reflect the increasing average age of the Plan participants, the asset allocation has been modified to reduce the volatility of returns. To increase net investment returns, the entire portfolio has been indexed, reducing Plan investment management fees from 71 basis points to 9 basis points.

7. **Recent or Ongoing Negotiations:**

The collective bargaining agreement between Metro and the Transport Workers Union was renegotiated during 2017. Pension funding, is one of the major components of these negotiations. Past and future negotiations include reopeners in each year in order to address required matters that might arise prior to expiration of the bargaining agreement. As previously mentioned, the primary changes to the Plan resulting from the renegotiations of the collective bargaining agreement were increases in the employer and employee contribution rates, and, for those employees hired on or after January 1, 2018, the (i) changing the normal retirement date from age 65 to the age when the employee reaches full retirement age for purposes of receiving Social Security benefits, and (ii) eliminated the early retirement option.

8. **Most Recent Actuarial Experience:**

There has not been an experience study done in recent years. Due to the very small size of the participant population, it has been felt that preparation of a formal experience study would not add credible insight in our demographic assumptions. Rather, from time to time we have prepared short analysis of prior termination and retirement rates, as well as anecdotal analysis of compensation increase assumptions and mortality table assumptions and have modified actuarial assumptions as was felt appropriate.

9. **Current Assumed Rate of Return:**

The current assumed rate of return is 6.75%. This is the same rate that was used in 2017. There are no current plans to review the rate in the upcoming year.

10. **Most Recent Actuarial Valuation Report:**

Attached please find the most recent valuation dated January 1, 2018. The valuations are completed every year with the next one due January 1, 2019.

Milliman

Metro Area Transit Hourly Employees' Pension Plan

Actuarial Valuation as of January 1, 2018

Prepared by:

Gregg Rueschhoff, A.S.A.
Principal and Consulting Actuary

Milliman, Inc.
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milliman.com

May 18, 2018

May 18, 2018

Retirement Committee
Metro
2222 Cuming Street
Omaha, NE 68102

Re: January 1, 2018 Actuarial Valuation Report

Dear Committee Members:

At your request, we have conducted our actuarial valuation of the Metro Area Transit Hourly Employees' Pension Plan as of January 1, 2018. The major findings of the valuation are contained in this report. Changes in plan provisions, actuarial assumptions, or methods from the prior valuation are noted in the report.

In preparing our report, we relied, without audit, on information (some oral and some written) supplied by Metro. This information includes, but is not limited to, plan provisions, member data and financial information. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We hereby further certify that all costs, liabilities, rates of interest and other factors for the System have been determined on the basis of actuarial assumptions and methods which are internally consistent, individually reasonable (taking into account the experience of the Plan and reasonable expectations of future experience); and which, in combination, offer our best estimate of anticipated experience under the Plan. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions. The Retirement Committee has the final decision regarding the appropriateness of the assumptions and has adopted them as disclosed in this report.

Milliman

Milliman's work is prepared solely for the internal business use of the Plan Sponsor and the Plan's Trustees. Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions:

(a) The Plan Sponsor may provide a copy of Milliman's work, in its entirety, to the Plan Sponsor's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the Plan.

(b) The Plan Sponsor may distribute certain work product that Milliman and the Plan Sponsor mutually agree is appropriate as may be required by the Pension Protection Act of 2006.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

I, Gregg Rueschhoff A.S.A., am a member of the American Academy of Actuaries and an Associate of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I respectfully submit the following report and look forward to discussing it with you.

Sincerely,
MILLIMAN, Inc.

Gregg Rueschhoff, A.S.A.
Principal and Consulting Actuary
Member of the American Academy of Actuaries
Enrolled Actuary No. 17-04349

Table of Contents

VALUATION SUMMARY

REPORT SUMMARY

An actuarial valuation has been prepared as of January 1, 2018 to determine the range of annual contributions required to fund benefits of the Plan. The actuarial valuation will also be used to evaluate the funding status of the Plan. The results of the actuarial valuation are summarized in this Report. This Report Summary will focus attention on our principal recommendations and observations.

A. Funding Recommendation

Recommended Annual Contribution

The recommended annual contribution is displayed for the current and prior actuarial valuations:

	January 1, 2017	January 1, 2018
Recommended Annual Employer Contribution	$ 958,333	$ 835,474
Annual Covered Compensation	11,497,480	12,169,930
Recommended Annual Contribution	8.34%	6.87%

B. Plan Funding Status — Present Value of Accumulated Plan Benefits

The value of plan assets, the present value of vested accrued benefits, and the present value of accrued benefits are displayed and compared on the Plan Financial Information page of this report. Plan assets are valued at market value.

Summarizing from the Plan Financial Information display:

	Values as of January 1, 2018	Funded Ratio 2017	Funded Ratio 2018
Market Value of Plan Assets	$24,197,918	--	--
Actuarial Present Value:			
Vested Accrued Benefits	31,337,771	72%	77%
Accrued Benefits	31,596,872	71%	77%

The interest rate used to determine the actuarial present value of vested and accrued benefits is 6.75%.

REPORT SUMMARY (Continued)

C.   Factors Affecting the Actuarial Valuation Results

Covered Employees

Ages of Active Participants — The average age of active participants in the valuation was 53.9 for the current actuarial valuation and 53.3 for the prior actuarial valuation.

Reported Compensation — Total covered pay for active participants decreased from $11,497,480 in 2017 to $12,169,930 in 2018. The number of active participants decreased from 208 to 200.

Average Salary — The average covered salary of active participants included in the valuation increased at an annualized rate of 10% per year as compared to an assumed annual salary increase assumption of 4.0%. The average annual covered salary reported for 2017 was $55,276 and $60,850 for 2018.

D.   Changes in Plan Provisions and Methods

The employer's contribution rate changed from 6.50% of all payroll to 7.50%. The employee's contribution rate changed from 6.00% of all payroll to 7.00%.

E.   Changes in Actuarial Assumptions

None. Please see page 11 for the full detail of the actuarial assumptions used.

ANNUAL PLAN CONTRIBUTION

The primary objective of preparing an actuarial valuation is to determine the amounts required to fund plan benefits in an orderly and responsible manner. Because the plan is a government plan, minimum annual funding requirements and maximum tax deductible limits established by ERISA are not applicable. The procedures followed to determine the recommended annual contribution is described below.

Recommended Contribution

The recommended contribution includes two components:

- **Annual Normal Cost** — The portion of total plan costs assigned to the current plan year by the Actuarial Cost Method.

- **Amortization of Unfunded Accrued Liability** — Level payment (determined as a level percentage of payroll) required to amortize the initial Unfunded Accrued Liability (UAL) over 30 years beginning January 1, 2012.

	Plan Year Beginning January 1,	
	2017	**2018**
Recommended Contribution:		
1. Annual Normal Cost		
Benefit Normal Cost	$ 849,749	$ 877,894
Administrative Expenses	35,000	35,000
Investment Expenses	17,266	16,939
Total	$902,015	$929,833
2. Annual Payment Required to Amortize Unfunded Accrued Liability	714,879	730,260
3. Annual Contribution (1 + 2)	1,616,894	1,660,093
4. Interest to Plan Year End	54,570	56,028
5. Estimated Employee's Contributions Adjusted with Interest to End of Year	713,131	880,647
6. Annual Recommended Contribution at End of Plan Year (3 + 4 - 5)	958,333	835,474
7. Covered Payroll	11,497,480	12,169,930
8. Contribution as a Percent of Payroll (6) ÷ (7)	8.34%	6.87%

VALUATION DETAIL

ACTUARIAL VALUE OF ASSETS

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book values of assets, representing the cost of investments, may be the best measure of the System's <u>ongoing</u> ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. The specific technique follows:

Step 1: Determine the expected value of plan assets at the current valuation date using the actuarial assumption for investment return and the actual receipts and disbursements of the fund for the previous 12 months.

Step 2: Subtract the expected value determined in Step 1 from the total market value of the Fund at the current valuation date.

Step 3: Multiply the difference between market and expected values determined in Step 2 by 25%.

Step 4: Add the expected value of Step 1 and the product of Step 3 to determine the actuarial value of assets.

1.	Actuarial Value of Assets as of January 1, 2017	$ 22,443,739
2.	Actual Receipts/Disbursements	
	a. Total Contributions	1,608,079
	b. Benefit Payments (including expenses)	(1,857,298)
	c. Net Change	(249,219)
3.	Expected Investment Earnings @ 6.75%	1,506,541
4.	Expected Actuarial Value of Assets as of January 1, 2018	23,701,061
5.	Market Value as of January 1, 2018	24,197,918
6.	Difference Between Market and Expected Values	496,857
7.	Actuarial Value of Assets as of January 1, 2018 (4 + 25% of 6, limited to 120% of 5)	$ 23,825,275

VALUATION RESULTS

A summary of the results of the actuarial valuations performed as of January 1, 2017 and January 1, 2018 is displayed below:

| | Plan Year Beginning January 1 | |
	2017	2018
Value of Plan Assets		
Cash & Equivalents	$ 525,756	$ 809,693
U. S. Government Securities and Treasury Bills	0	0
Convertible Securities	1,072,506	1,213,631
Corporate Bonds	8,131,480	9,089,959
Common Stock	11,822,794	13,224,597
Payable Transfer to Salaried Plan	0	0
Unsettled Trades	30,017	(139,962)
Receivable Transfer (contributed to wrong account)	0	0
Contribution Receivable	0	0
Market Value of Plan Assets	21,582,553	24,197,918
Actuarial Value of Plan Assets	22,443,739	23,825,275
Unfunded Accrued Liability		
1. Accrued Liability	$33,896,866	$35,249,385
2. Actuarial Value of Plan Assets	22,443,739	23,825,275
3. Unfunded Accrued Liability	11,453,127	11,424,110
Annual Normal Cost (including expenses)	$902,015	$929,833

ACTUARIAL PRESENT VALUE OF ACCUMULATED PLAN BENEFITS

Another objective of preparing the actuarial valuation is to evaluate the funding status of the Plan. The following display compares the funding status of the Plan for the two most recent actuarial valuations.

		January 1, 2017	**January 1, 2018**
1.	Actuarial Present Value of Vested Accumulated Plan Benefits		
	Retirees and Beneficiaries of Deceased Participants	$18,253,118	$18,262,461
	Vested Terminated Participants	919,080	1,047,629
	Active Participants	10,861,404	12,027,681
	Total	30,033,602	31,337,771
2.	Actuarial Present Value of Non-Vested Accumulated Plan Benefits for Active Participants	$ 248,220	$ 259,101
3.	Actuarial Present Value of Accumulated Plan Benefits (1 + 2)	30,281,822	31,596,872
4.	Market Value of Assets	21,582,533	24,197,918
5.	Funded Ratio: Vested Accumulated Benefits	72%	77%
6.	Funded Ratio: Total Accumulated Benefits	71%	77%
7.	Interest Rate	6.75%	6.75%

The actuarial present value of vested and non-vested benefits has been determined based on the actuarial assumptions described on Page 11.

Additional background regarding the Plan Financial Information:

1. Plan assets are valued at their market value.

2. A comparison of the actuarial present value of accrued benefits with the value of assets provides a measure under an active plan of the progress being made toward funding the benefits which are accruing, according to measurement methods reasonably consistent for all plans. Other actuarial calculations are made to determine year-to-year contribution levels.

3. The actuarial values which would apply in the event the plan terminated would differ from those shown, for many reasons including, but not necessarily limited to, the following:

    a. Certain plan provisions which may apply in the event of partial or complete plan termination are not reflected in the benefits valued nor in the actuarial assumptions employed.

    b. Vested benefits may be limited with reference to the value of the assets of the fund.

    c. Actuarial computations under actuarial assumptions other than those specified herein may be required as a basis for determining plan benefits in the event of a partial or complete termination of the plan.

    d. Benefits deemed already earned may not be the same as those underlying the actuarial values shown.

4. The benefits reflected above have been determined on the basis of the plan provisions in effect on the respective dates. Benefits payable at retirement, death, disability, and vested termination of employment are included, to the extent that they are deemed to have accrued as of the computation dates.

VALUATION BASIS

ACTUARIAL METHODS

Actuarial Cost Method
The costs in this report were prepared using the Individual Entry Age Normal cost method.

Under this Method, the Normal Cost is computed as the dollar amount which, if paid from the earliest time each participant joined the plan (thus, entry age) until his retirement or termination, would accumulate with interest at the rate assumed in the valuation to a fund sufficient to pay all benefits under the plan. The normal cost for the plan is determined by summing the normal costs of all participants.

The Actuarial Accrued Liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The Unfunded Actuarial Liability is the excess of the Actuarial Accrued Liability over the plan assets actually on hand on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions adjust the unfunded actuarial liability.

As experience develops with the plan, so-called actuarial gains and actuarial losses result. These actuarial gains and losses indicate the extent to which actual experience is deviating from that expected on the basis of the actuarial assumptions. All gains and losses, including those from the interest assumption, affect the plan's unfunded accrued liability and are amortized over future years.

The annual accrued liability payment is the portion of the unfunded accrued liability that is amortized for the year.

Asset Valuation
The value of plan assets is based on a smoothing technique that will spread out the effect of volatility in the rate of investment return. A detailed description of the asset valuation method is provided on page 4.

ACTUARIAL ASSUMPTIONS

Interest Rate
6.75% compounded annually

Salary Scale
Salaries were assumed to increase at an annual rate of 4.0% compounded annually following the valuation date.

Mortality Rates
RP 2000 with generational improvements.

Withdrawal Rates
Based on a table of annual withdrawal rates illustrated below:

	Rate of Withdrawal	
Age	Year 1 & 2	Years 3+
20	15%	12%
25	15	12
30	12	11
35	10	10
40	8	8
45	8	6
50	8	4
55	8	3

Disability Rates
Based on Table 5, Period 2 of the Society of Actuaries 1952 Disability Study.

Retirement Rates

	Rates of Retirement	
Age	<30 YOS	>30 YOS
58	5%	20%
59	5	20
60	5	20
61	5	20
62	25	25
63-64	25	25
65-66	50	50
67	100	100

Expenses
$35,000 for administrative expenses, plus 0.07% of Market Value of Assets for investment expenses.

SUMMARY OF PLAN PROVISIONS

Original Effective Date
July 1, 1979.

Plan Year
January 1 through December 31.

Participation
First day of the month next following completion of 120 days of service.

Definitions

Year of Service
A Year of Service generally means a twelve consecutive month period beginning with the person's employment date during which he has worked not less than 1,000 hours.

Final Average Annual Compensation
Average Monthly Compensation paid during the five highest paid years out of the last ten years of employment preceding cessation of employment.

Compensation
Regular compensation plus overtime but excluding reimbursed expenses, bonuses, commissions, deferred compensation and other extra or unusual compensation.

Age and Service Requirements for Benefits

Normal Retirement Date (NRD)
Age 65 for employees hired before January 1, 2018 and for employees hired after January 1, 2018, the NRD will be the employee's Social Security Retirement Age.

Early Retirement
Age 58 with 20 or more years of service or any age with 30 or more years of service for employees hired before January 1, 2018. There is no early retirement provision for employees hired after January 1, 2018.

Late Retirement
The first of any month after normal retirement date.

Vesting
Based on the following schedule:

Years of Service	Vesting %
Less than 5	0%
5	50%
6	60%
7	70%
8	80%
9	90%
10 or more	100%

Spouse's Benefits
Married and completed ten years of service.

Benefits

Normal Retirement
A monthly retirement income equal to 1.40% of final average monthly compensation multiplied by years of credited service for empployees hired before January 1, 2018.

For employees hired after January 1, 2018, the benefit factor is 1.20% for years of service 1 through 10, 1.30% for years 11 through 20 and 1.40% thereafter.

Early Retirement
An amount computed as a normal retirement benefit based on credited service and compensation to the early retirement date and first payable at normal retirement date or payable early with reduction of 1/2% for each month that early retirement precedes normal retirement. There is no reduction if the participant has 30 or more years of service at early retirement date.

Late Retirement
Calculated in the same manner as normal retirement benefit.

Spouse's Benefit
The vested accrued benefit the participant would have received if he terminated employment, deferred his benefit to his earliest retirement date, and elected the 100% joint and survivor annuity option.

Vested Benefits
A deferred retirement income, based on years of service and final average compensation at termination date. Reduced benefits may be started early in specified cases. A lump sum settlement can be requested.

Forms of Annuity

Normal
Monthly payments for life with refund at death of the excess, if any, of the participant's contributions over the payments received.·

Optional
a.   Ten years certain and life annuity, or

b.   Contingent annuity with either 100%, 66 2/3% or 50% of the annuity being payable to spouse for life after the participant's death (the 100% contingent annuity option is automatic for married participants unless another option is elected.)

Source of Funds

Participant Contributions
7.00% of payroll.

Employer Contributions
7.50% of payroll.

Medium of Financing
The benefits will be funded under a self-administered trust with a corporate trustee.

PARTICIPANT CENSUS DATA

AS OF JANUARY 1, 2018

ACTIVE PARTICIPANTS INCLUDED IN VALUATION

Age at Valuation Date	Male	Female	Total
Under 20	0	0	0
20 – 24	2	0	2
25 - 29	0	0	0
30 - 34	9	0	9
35 - 39	7	2	9
40 - 44	16	4	20
45 - 49	20	5	25
50 - 54	24	5	29
55 - 59	33	6	39
60 - 64	45	6	51
65 & Over	14	2	16
	170	30	200

NON-ACTIVE PARTICIPANTS INCLUDED IN VALUATION

	Number	Annual Benefit
Retired Participants or Beneficiaries	185	$1,890,384
Vested Terminated Participants	41	190,584
Total	229	$2,080,968

Appendix D

Omaha Civilian Employees Retirement Plan Information

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City of Omaha
Jean Stothert, Mayor

October 15, 2018

Senator Mark Kolterman, Chairperson
Nebraska Retirement Systems Committee
PO BOX 94604
State Capitol
Lincoln, NE 68509-4604

Dear Senator Kolterman:

Neb. Rev. Stat § 13-2402(3) requires a governing entity that offers a defined benefit retirement plan to file a report if the funded ratio is less than eighty percent. The City of Omaha is submitting this report regarding the City of Omaha Employees Retirement System (COERS) because the funded ratio is less than eighty percent.

The City, through its negotiations with the bargaining agents, has made efforts to address the funding shortfall in COERS. Some of those efforts are addressed below. The attached table compares the actuarial data for plan years 2013 through current plan year 2018.

COERS has been underfunded for a number of years and the circumstances leading to it being underfunded are varied. When the system was fully funded in the late 1990s, benefits were increased and even though the actuarial cost was calculated, the benefits appear to have exceeded those costs. There also have been some years where the investment loss was historically large. Other factors include reduction in the number of civilian employees over the past 20 years, lack of wage increases in some instances, and the delay in replacing retired personnel.

As a result of an Experience Study for 2012-2015 which was accepted in February, 2018, a number of changes to the actuarial assumptions were adopted by the Board as we move forward. A copy of the Experience Study is included with this report. The following changes were made to the economic assumptions which changes were made in the January 1, 2018 actuarial valuation:

	Current	Recommended
Price inflation	3.25%	2.50%
Investment return	8.00%	7.50%
General wage growth	4.00%	3.10%
Payroll growth	4.00%	3.00%
Cash Balance Interest Crediting Rate	6.25%	6.00%

There were also some changes to the Demographic assumption, the most significant of which was a change to the mortality assumption.

In an effort to improve the condition of the system, the City entered into new labor agreements with all its civilian bargaining groups at the end of 2014/beginning of 2015. These bargaining agreements addressed payroll years 2013 through 2017 and included increased contributions by the City for wages paid 2013

until the contracts became effective. An actuarial projection was recently done and it is enclosed. It shows that the system will be fully funded in 2048.

The summary of some of the changes made for the 2013 to 2017 agreements addressing civilian employees are:

- Contributions by the City increased 7% over the four years of the agreements from 11.775% to 18.775%.
- Existing employees will receive 1.9% per year for future years of service instead of 2.25%.
- The City went from the Rule of 80 to the Rule of 85 and raised the minimum retirement age with some grandfathering of these provisions. The retirement age went from 60 to 65 over the course of the agreements.
- The smoothing of the salary on which a person's pension was calculated from a highest one year in your last five years to the average of your last five years of employment.
- Dramatically decreased the disability benefit for the existing employees.
- Implementing a Cash Balance Plan for employees hired on or after 3/1/2015. A cash balance plan is a type of defined benefit plan which allows for the employer and employee to share some of the risk of poor investment returns. The pay credit for the plan starts at 13% and goes up 1% for each 8 years of service. The interest credit is guaranteed at 4% with an additional amount being three quarters of the amount earned by the Plan over 7% on a 5 year rolling average, with the interest credit being capped at 7%. One has to have 10 years of service to vest.

The City has commenced negotiations with the civilian bargaining groups for 2018 and beyond. At this time, it is likely that new labor agreements will be in effect for one group before the start of 2019, but not for the other groups. In addition, it is not anticipated that these labor agreements will address further pension changes/reform, but will provide an opportunity for the parties to reopen the discussion if they feel it is appropriate and circumstances change.

As of January 1, 2018, the system had a market value of $254.5 million in assets and a funded ratio of 53%. It had a funded ratio of 55% in 2017 and 56% in 2016. The actuarial contribution to the system had improved for a number of years, but as a result of the change in assumptions, there is a shortfall in the actuarial required contribution of 2.206% after a couple of years where there was an excess. This is still far better than shortfalls in excess of 15% that occurred in 2013 and 2014. Additional savings should be seen in the future years as members covered by the provisions of the Cash Balance Plan continue to grow. The most recent projections show the system will reach fully funded status in 30 years. The assumed rate of return for the system is 7.5%, a 1/2% decrease from previous years.

The unfunded actuarial liability (UAL) is funded on a "layered" basis, with the initial base being funded as a level-percent of payroll over a 25-year closed period that began January 1, 2016. The base attributable to the increase in the UAL due to the change in assumptions in the 2018 valuation is amortized over a closed 25-year period. In addition, a new base is created in each valuation which is equal to the unexpected change in the UAL from actual versus expected experience, as measured in that valuation. Each experience base is funded as a level percent of payroll over a 20-year closed period.

As requested, we enclose the most recent Actuarial Experience Study which was submitted in February, 2018 and the most recent Actuarial Valuation Report which was completed in September, 2018.

If you or the Committee should have any questions regarding this report, please let me know.

Sincerely,

Allen R. Herink
City Comptroller

Enclosures

COERS EXHIBIT 1

ITEM	2013	2014	2015	2016	2017	2018
Funding Status	54%	54%	56%	56%	55%	53%
Assumed Rate of Return	8%	8%	8%	8%	8%	7.5%
Actual Return	16.2%	5.3%	3.5%	10.2%	13.1%	Pending*
Net Assets (actuarial value)	$235,591,941	$240,342,815	$242,248,074	$243,516,453	$246,234,597	$251,320,837
Unfunded Actuarial Accrued Liability	$200,678,468	$205,174,423	$188,911,964	$193,616,559	$197,537,024	$223,286,679
Normal Cost ($)	$8,080,852	$7,808,536	$5,822,238	$6,149,062	$6,229,103	$6,578,160
Normal Cost (%)	13.730%	13.231%	9.881%	9.843%	9.721%	9.923%
Member Contribution Rate	10.075%	10.075%	10.075%	10.075%	10.075%	10.075%
Employer Contribution Rate	11.775%	11.775%	18.775%	18.775%	18.775%	18.775%
Actuarial Required Contribution	$15,783,086	$17,996,034	$15,342,579	$12,042,214	$12,519,770	$15,264,547
Actuarial Rate of Contribution (ARC)	34.998%	38.454%	33.724%	27.526%	27.740%	31.056%
Contribution Margin	-15.7111%	-16.604%	-4.874%	1.324%	1.110%	-2.206%
Employer Actual Dollars Contributed	$7,194,482	$12,326,643	$12,401,231	$12,779,968	$13,227,230	Pending*
% of ARC by Employer Contribution	41.33%	71.82%	84.50%	108.36%	106.81%	Pending*

* Pending info will be available at year end

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

October 2, 2018

Mr. Allen Herink
City of Omaha
1819 Farnam Street
Omaha, NE 68183

Re: Projections of Long Term Funding for City of Omaha Employees' Retirement System

Dear Al:

At your request, we have completed an actuarial projection of the future valuation results for the City of Omaha Employees' Retirement System (COERS) over the next 30 years. This projection is based on the January 1, 2018 actuarial valuation results and was performed to examine the long-term funding of the System, given the current scheduled contribution rates and benefit structures in place.

This letter summarizes the results of our study and quantifies the expected changes in the funded ratio, unfunded actuarial liability, and full funding date (the year in which the actuarial assets is equal to or greater than the System's liability, i.e., no unfunded actuarial liability exists). For purposes of this study, the System's funding was studied each year over the long term, assuming all of the actuarial assumptions are met in the future, including the investment return assumption.

Results

The projection results that were used in our analysis require the use of many assumptions. Please see the "Disclaimers, Caveats, and Limitations" section later in this letter for a detailed discussion of the assumptions and methods used to produce the projected financial results for the System. To the extent actual experience deviates from that assumed, the future valuation results will also vary, perhaps significantly, from those in our projections.

Based on our projections, the Omaha Employees' Retirement System is expected to reach fully funded status (no unfunded actuarial liability) in the January 1, 2048 valuation. These projections assume all assumptions, including the investment return assumption (7.50%), are met in all future years.

Results

Exhibit 1, attached to this letter, shows the projected actuarial liability, actuarial assets, unfunded actuarial liability and funded ratio (actuarial assets divided by actuarial liability) for each year in the 30-year projection period for COERS. Exhibits 2 and 3 are graphs of the data in Exhibit 1. The blue bar is the portion of the total actuarial liability that is funded (which is equal to the lesser of the asset value and the actuarial liability) and the red bar represents the unfunded actuarial liability. The green bar at the end of the projection period reflects the fact that assets exceed the actuarial liability. As these exhibits indicate, COERS is projected to reach full funding (no unfunded actuarial liability) in the January 1, 2048 valuation.

The projections are dependent on a number of factors including the actuarial assumption used. If other assumptions were used, the results would vary, perhaps significantly.

Disclaimers, Caveats, and Limitations

This analysis is based primarily upon the benefit provisions and actuarial assumptions used in the January 1, 2018 actuarial valuation and the actuarial projection model prepared by Cavanaugh Macdonald Consulting, LLC. Significant items are noted below:

- An investment return assumption of 7.50% was used to project both assets and liabilities for the COERS.

- The liabilities and costs used in our analysis were based on the actuarial assumptions regarding mortality, disability, retirement, salary increases, and termination of employment used in the January 1, 2018 actuarial valuation.

- The number of active members in the System is assumed to remain at the current level over the entire projection period. When current active members were assumed to terminate or retire, they were replaced by new hires with a similar entry age as recent new hires.

- It was assumed there would be no change to the plan provisions or scheduled contribution rates over the projection period.

- The entry age normal cost method was used to develop the normal costs.

- We relied upon the membership data as provided by the City for the January 1, 2018 actuarial valuation. The numerical results depend on the integrity of this information. If there are material inaccuracies in the data, the results presented herein may be different and our calculations may need to be revised.

The projections used in our analysis are based on one set of assumptions out of a range of many possibilities over a 30 year projection period. A different set of assumptions could lead to different results. The projections are not intended to predict the System's financial condition or its ability to pay benefits in the future, and do not provide any guarantee of future financial soundness of the System. Over time, a defined benefit plan's total cost will depend on a number of factors including

the amount of benefits paid, the number of people paid benefits, the duration of the benefit payments, plan expenses, and the amount of earnings on assets invested to pay benefits. These amounts and other variables are uncertain and unknowable at the time our calculations were prepared. Because not all of the assumptions will unfold exactly as expected, actual results will differ from the projections. To the extent that actual experience deviates significantly from the assumptions, the funded status of the System could be significantly better or significantly worse than indicated in this study.

I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. I am available to provide additional information or answer questions if it is necessary or desirable.

Please feel free to contact me if you have questions or need anything further.

Sincerely,

Patrice Beckham

Patrice A. Beckham, FSA, FCA, EA, MAAA
Principal and Consulting Actuary

Exhibit 1
City of Omaha Employees' Retirement System

Projection of Future Valuation Results

Jan 1 Year	Unfunded Actuarial Liability ($M)	Actuarial Liability ($M)	Actuarial Assets ($M)	Funded Ratio
2018	$223.29	$474.61	$251.32	53.0%
2019	224.56	478.29	253.73	53.0%
2020	225.86	481.68	255.82	53.1%
2021	227.07	484.60	257.53	53.1%
2022	228.17	487.18	259.01	53.2%
2023	229.02	489.64	260.62	53.2%
2024	229.57	492.10	262.53	53.4%
2025	229.74	494.46	264.72	53.5%
2026	229.52	496.74	267.22	53.8%
2027	228.86	498.97	270.11	54.1%
2028	227.72	501.21	273.49	54.6%
2029	226.07	503.47	277.40	55.1%
2030	223.82	505.79	281.97	55.7%
2031	220.92	508.10	287.18	56.5%
2032	217.33	510.42	293.09	57.4%
2033	212.96	512.78	299.82	58.5%
2034	207.77	515.23	307.46	59.7%
2035	201.67	517.85	316.18	61.1%
2036	194.56	520.67	326.11	62.6%
2037	186.37	523.58	337.21	64.4%
2038	177.02	526.63	349.61	66.4%
2039	166.38	529.90	363.52	68.6%
2040	154.36	533.56	379.20	71.1%
2041	140.81	537.52	396.71	73.8%
2042	125.61	541.82	416.21	76.8%
2043	108.63	546.47	437.84	80.1%
2044	89.68	551.59	461.91	83.7%
2045	68.59	557.26	488.67	87.7%
2046	45.18	563.49	518.31	92.0%
2047	19.23	570.34	551.11	96.6%
2048	(9.50)	577.95	587.45	101.6%

Projections are based on the January 1, 2018 actuarial valuation and assume that all assumptions are met in the future, including the 7.50% assumed rate of return. To the extent actual experience differs from that assumed, the actual valuation results in future years will also differ from the projections shown here. Please see the January 1, 2018 valuation report for details on the actuarial methods and assumptions used in this study.

This exhibit is an attachment to a letter that contains important information and explanations regarding the numbers shown. Therefore, it should only be considered with the accompanying letter from Cavanaugh Macdonald Consulting dated October 2, 2018.

Exhibit 2

City of Omaha Employees' Retirement System

Projected Assets and Unfunded Actuarial Liability (UAL)

These projections assume that all actuarial assumptions are met in each future year, including the 7.50% assumed rate of return on the market value of assets. This graph should only be considered with the letter from Cavanaugh Macdonald Consulting dated October 2, 2018 which contains important information regarding the assumptions and methods used in the projections.

Exhibit 3

City of Omaha Employees' Retirement System
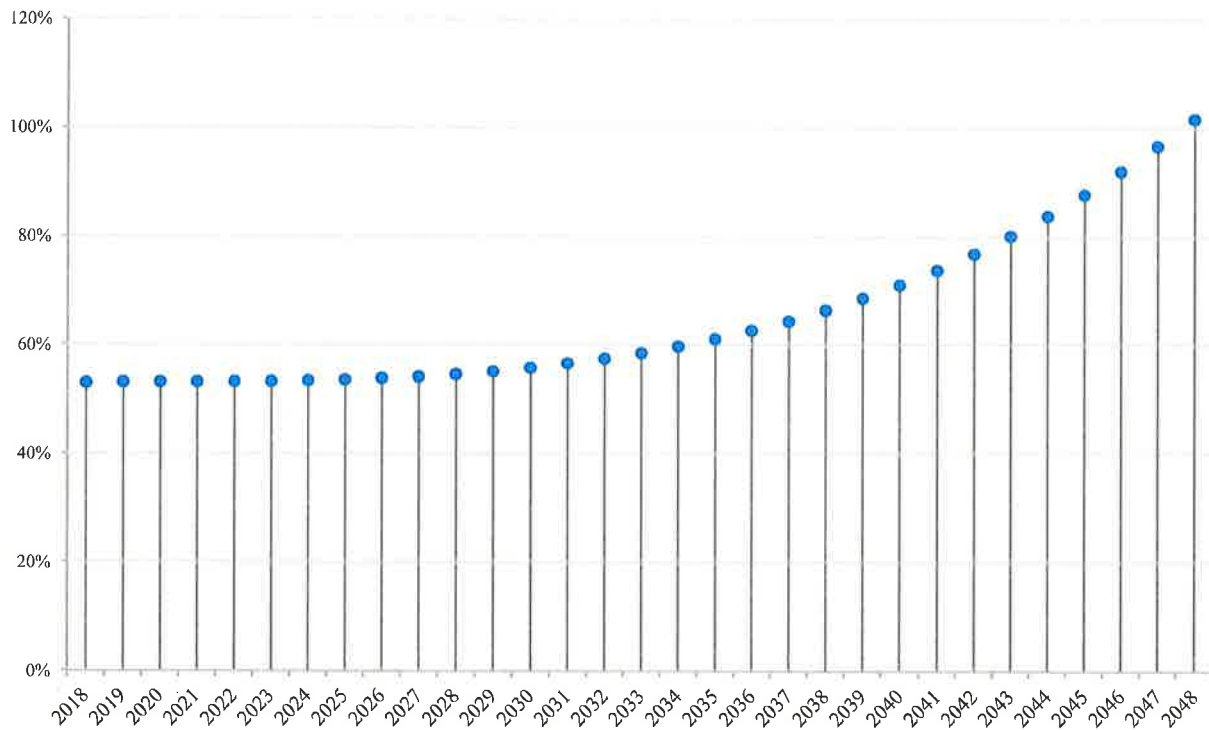
Projected Funded Ratio

These projections assume that all actuarial assumptions are met in each future year, including the 7.50% assumed rate of return on the market value of assets. This graph should only be considered with the letter from Cavanaugh Macdonald Consulting dated October 2, 2018 which contains important information regarding the assumptions and methods used in the projections.

Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

City of Omaha Employees' Retirement System
Annual Report to the Nebraska Legislative Committee

Presented by:
Patrice A. Beckham, FSA

December 3, 2018

www.CavMacConsulting.com

Background

- City ordinance requires a 50/50 split of costs between the city and members

- Both benefit provisions and contribution rates are negotiated in labor contracts

- COERS members include employees covered by several different bargaining groups.
  - At this time, no anticipated pension changes are expected in new labor agreements for 2018 and beyond.

Background

> Due to funding outlook after Great Recession, significant changes to both benefit provisions and contributions were made at end of 2014/beginning of 2015

- Later retirement age (Rule of 80 to 85 and age 60 to age 65)

- Existing employees' benefit accrual lowered from 2.25% to 1.9%

- Benefits based on highest 5 years vs highest one year

- Disability benefit for existing employees significant decreased

- Increased contributions by city by 7%

- Implemented a Cash Balance Plan for employees hired on/after 3/1/2015

  ✓ Shares pre-retirement risk directly with employees

  ✓ Guaranteed interest credit of 4% plus dividend based on actual returns

Historical Funded Status

Actual vs Actuarial Contributions
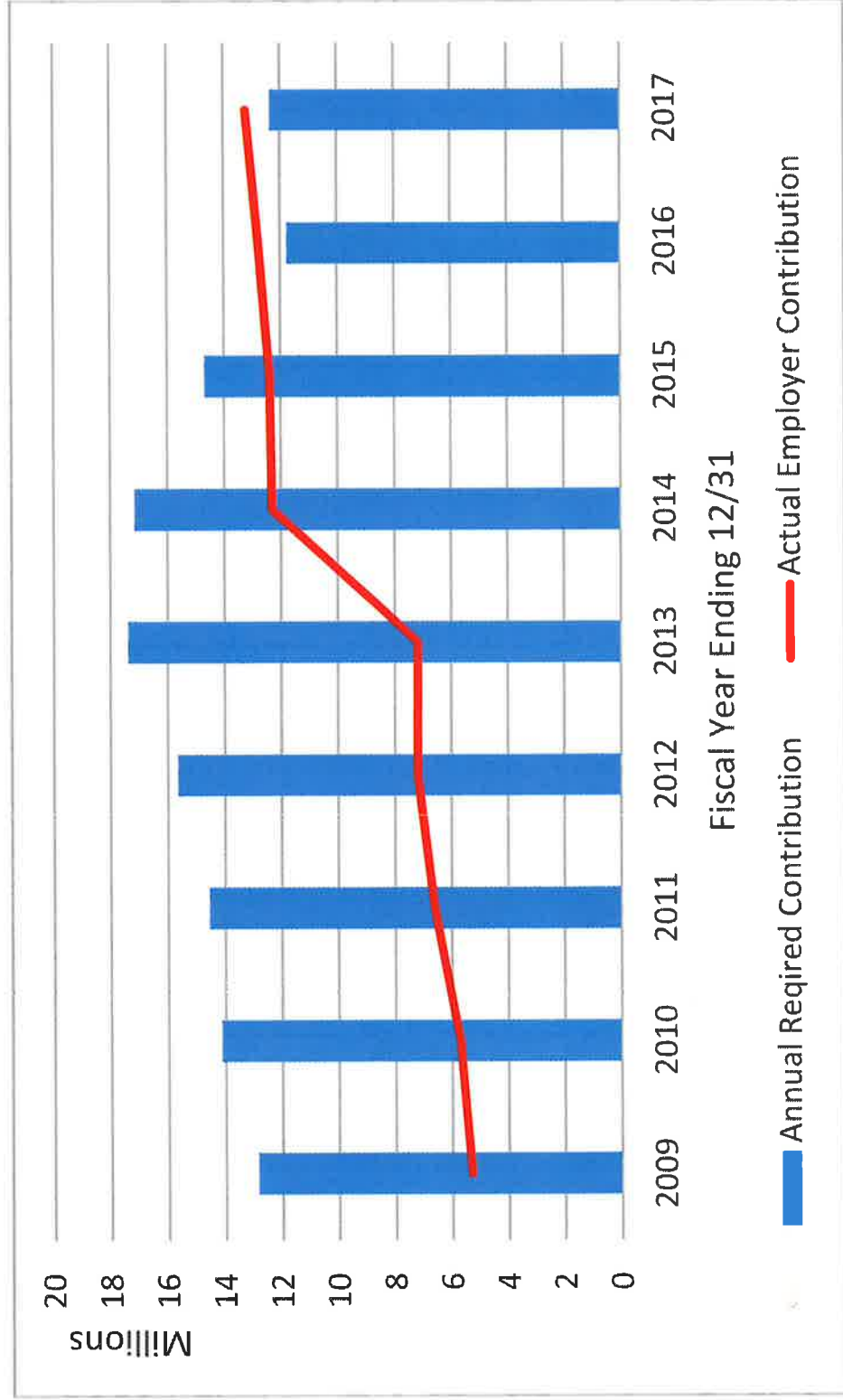
Normal Cost Rate

January 1, 2018 Actuarial Valuation

➢ Experience study performed in 2017 with results presented to the Board in 2018

- Lowering inflation assumption from 3.25% to 2.50%

  – Investment return assumption from 8.00% to 7.50%

  – General wage increase from 4.00% to 3.10% (part of individual salary increase assumption)

  – Payroll growth assumption from 4.00% to 3.00%

  – Interest crediting rate assumption for cash balance accounts from 6.25% to 6.00%

- Changing mortality to most recently published table, RP-2014 Table with one-year age setback for females (no age adjustment for males)

- Other changes (retirement, termination of employment, refund election) were less significant

Impact of Assumption Changes
(Measured on 1/1/18 Valuation)

	Old Assumptions	New Assumptions	Change
Actuarial Liability ($M)	$ 447.1	$ 474.6	$ 27.5
Actuarial Assets ($M)	251.3	251.3	0.0
Unfunded Actuarial Liability	$ 195.8	$ 223.3	$ 27.5
Funded Ratio (Actuarial Assets)	56.21%	52.95%	(3.26%)
1. Employee Contribution Rate	10.075%	10.075%	0.00%
2. Employer Contribution Rate	18.775%	18.775%	0.00%
3. Actuarial Contribution Rate	27.201%	31.056%	3.855%
4. Contribution Margin/(Shortfall)	1.649%	(2.206%)	3.855%
(1) + (2) – (3)			

Note: numbers may not add due to rounding.

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Key Valuation Measurements

	2018	2017	2016
Actuarial Liability ($M)	$ 474.6	$ 443.8	$ 437.1
Actuarial Assets ($M)	$ 251.3	$ 246.2	$ 243.5
Unfunded Actuarial Liability	$ 223.3	$ 197.5	$ 193.6
Funded Ratio (Actuarial Assets)	53%	55%	56%
Funded Ratio (Market Assets)	54%	54%	53%
Scheduled Rate (Total)	28.850%	28.850%	28.850%
Actuarial Contribution Rate	(31.056%)	(27.740%)	(27.526%)
Contribution Margin/(Shortfall)	(2.206%)	1.110%	1.324%

Note: numbers may not add due to rounding.

Membership Information

	2018	2017	2016	2015
Active Members	1,222	1,197	1,194	1,143
Estimated Payroll	$72.8	$70.9	$69.0	$64.9
Average Attained Age	45.6	46.2	46.5	46.6
Average Entry Age	36.7	36.7	36.7	36.5
Retirees/Beneficiaries	1,364	1,321	1,274	1,286
Disabled Members	101	109	112	114
Average Inactive Benefit	$23,746	$23,323	$22,923	$22,238

Historical Active Membership Information

Active Membership

January 1,

■ Cash Balance ■ Final Pay

Cash Balance members increased from 18% of the total in the 2017 valuation to 27% in the 2018 valuation.

Asset Values ($M)

	Market	Actuarial
Assets, 1/1/2017	$ 239.8	$ 246.2
▪ Contributions	20.3	20.3
▪ Benefit Payments	(35.4)	(35.4)
▪ Investment Income	29.8	20.2
Assets, 1/1/2018	$ 254.5	$ 251.3
Estimated Net Return	12.8%	8.5%

Return of 8.5% produced an actuarial gain of $1M on actuarial value of assets.

Deferred investment gain at 1/1/2018 is $3 million compared to deferred investment loss of $6 million at 1/1/2017.
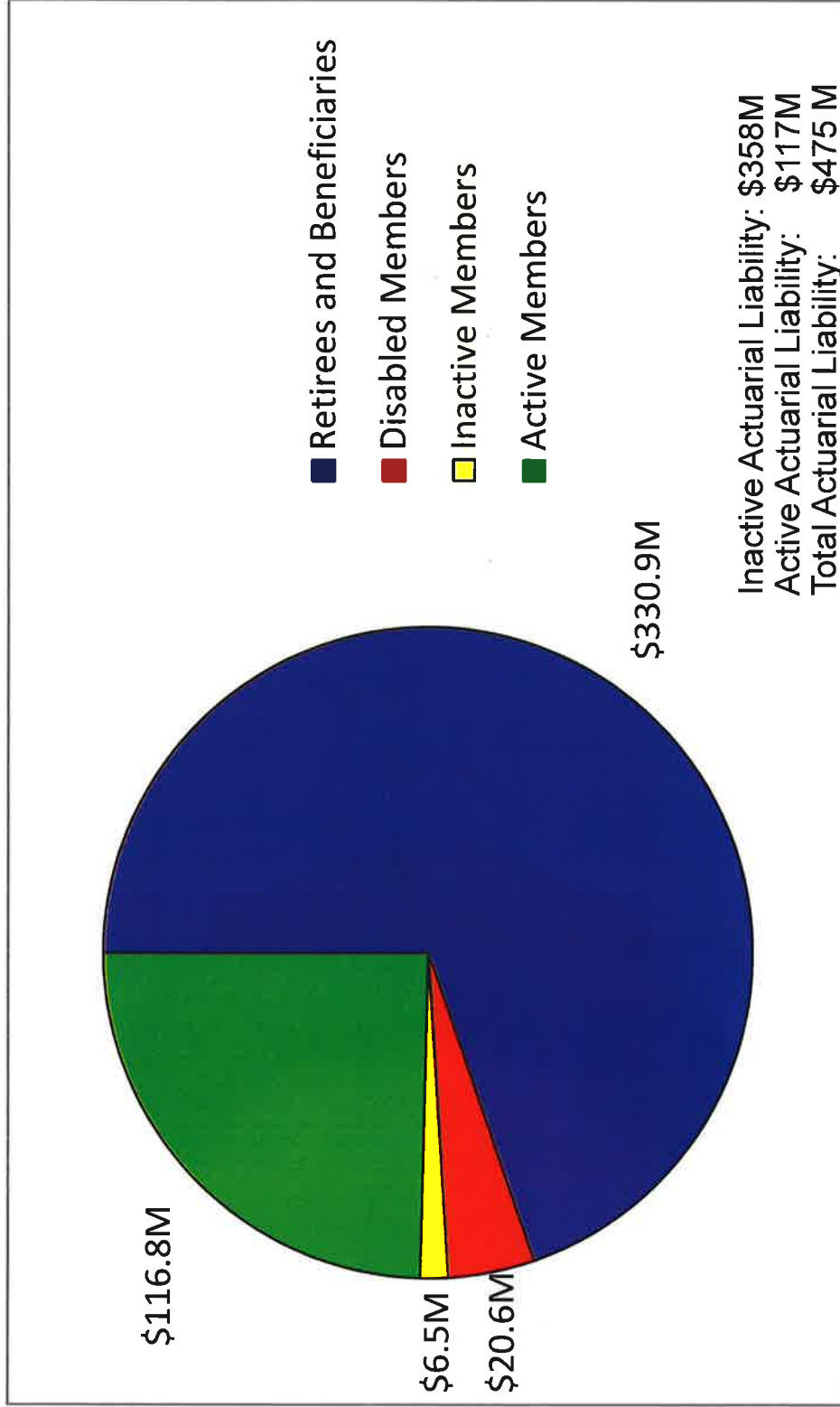
Actuarial Liabilities by Group

$116.8M

$6.5M

$20.6M

$330.9M

- Retirees and Beneficiaries
- Disabled Members
- Inactive Members
- Active Members

Inactive Actuarial Liability: $358M
Active Actuarial Liability: $117M
Total Actuarial Liability: $475 M

Note: numbers may not add due to rounding.

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Unfunded Actuarial Liability ($M)

	2017	2016	2015
UAL January 1	$198	$194	$189
– Expected change from amortization method	2	3	(1)
– Contributions below/(above) actuarial rate	(1)	(1)	2
– Investment experience	(1)	2	4
– Liability experience	(2)	0	0
– Other experience	0	0	1
– Change in valuation of QDRO records	0	0	(1)
– Assumption changes	27	0	0
UAL December 31	$223	$198	$194

Actuarial Contribution Rate

	Jan 1, 2018	Jan 1, 2017	Jan 1, 2016
Normal Cost	9.923%	9.721%	9.843%
UAL Payment	21.133%	18.019%	17.683%
Total Actuarial Rate	31.056%	27.740%	27.526%
Member Rate	10.075%	10.075%	10.075%
City Rate	18.775%	18.775%	18.775%
Total Rate	28.850%	28.850%	28.850%
(Shortfall)/Margin	(2.206%)	1.110%	1.324%

Contribution shortfall does not necessarily mean the System will never reach full funding. Open group projections are necessary to evaluate the System's long term funding.

Change in Contribution Rate

Actuarial Rate - January 1, 2017	**27.740%**
– Investment experience	(0.106)
– Demographic experience	(0.203)
– Other experience	(0.023)
– Contributions above the actuarial rate	(0.087)
– Change in normal cost rate	(0.196)
– Payroll growth lower than expected	0.076
– Assumption changes	3.855
Actuarial Rate - January 1, 2018	**31.056%**

Projections

➤ Valuation results are a single point in time measurement and do not lend insight into future trends

- Contribution rates are fixed in bargaining agreements (actuarial contribution rate is not made each year)

- Open group projections are needed to determine future funding trends

➤ Projections assume all assumptions are met each year in the future

- We know this particular scenario will not happen, but the important result is the trend of the funding ratio

- Actual experience each year, both favorable and unfavorable, will change the projected date of full funding

- Continual monitoring is critical to sustainability of the system

Long Term Projections
Funded Ratio
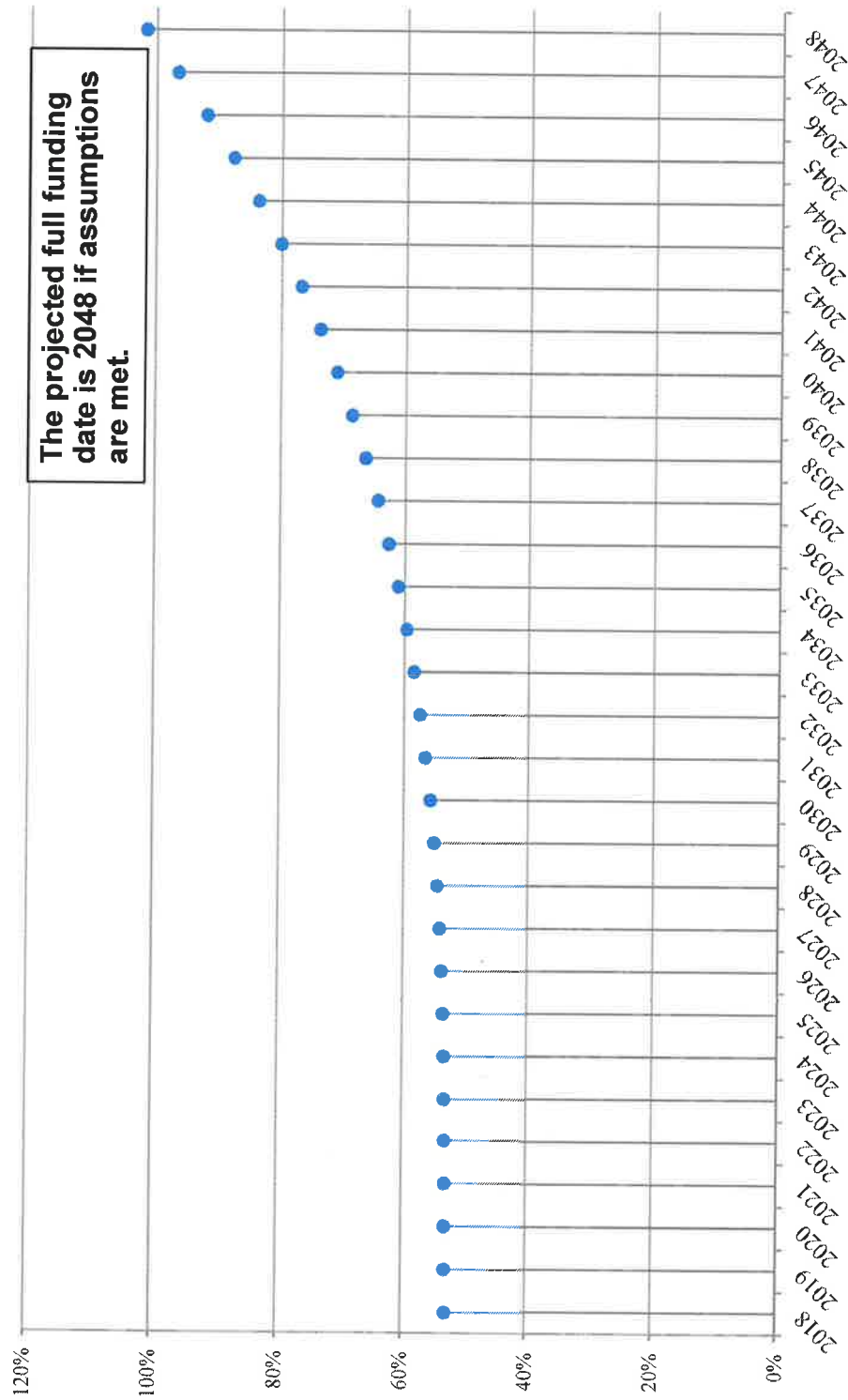
The projected full funding date is 2048 if assumptions are met.

Assumes all assumptions, including a 7.5% return, are met in all future years. Current contribution rates are assumed for the entire projection period.

Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

The City of Omaha
Employees' Retirement System

Actuarial Valuation as of
January 1, 2018

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

August 23, 2018

Board of Trustees
City of Omaha Employees' Retirement System
1819 Farnam Street
Omaha, NE 68183

RE: January 1, 2018 Actuarial Valuation

Members of the Board:

In accordance with your request, we have completed an actuarial valuation of the City of Omaha Employees' Retirement System as of January 1, 2018 for the plan year ending December 31, 2018. The major findings of the valuation are contained in this report. There have been no changes to the actuarial methods since the prior valuation. However, there have been several changes to the actuarial assumptions used in this valuation as a result of the completion of an experience study in February 2018. All of the recommended assumptions from the experience study were adopted by the Board of Trustees and are first used in this valuation. The net impact of the assumption changes was an increase in both the unfunded actuarial liability and the total actuarial contribution rate.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the City's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information provided in prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: experience differing from that anticipated by the 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 System's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this report are for purposes of determining the actuarial contribution rates for funding the System. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in separate reports.

The consultants who worked on this assignment are pension actuaries. CMC's advice is not intended to be a substitute for qualified legal or accounting counsel.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries, has experience in performing valuations for public retirement plans, and meets the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board and the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures based on the current provisions of the retirement plan and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix B.

I respectfully submit the following report and look forward to discussing it with you.

Sincerely,

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

TABLE OF CONTENTS

This report presents the results of the January 1, 2018 actuarial valuation of the City of Omaha Employees' Retirement System. The primary purposes of performing the valuation are:

- to estimate the liabilities for the future benefits expected to be provided by the System;
- to determine the actuarial contribution rate, based on the System's funding policy;
- to measure and disclose various asset and liability measures;
- to monitor any deviation between actual System experience and experience predicted by the actuarial assumptions so that recommendations for assumption changes can be made when appropriate;
- to analyze and report on any significant trends in contributions, assets and liabilities over the past several years.

There were no changes to the benefit provisions or actuarial methods since last year's report. However, there have been several changes to the actuarial assumptions used in this valuation as a result of the four-year experience study completed in February 2018. All of the recommended assumptions were adopted by the Board of Trustees and are first used in this valuation, including:

- Inflation assumption decreased from 3.25% to 2.50%.
- Investment return assumption decreased from 8.00% to 7.50%.
- General wage growth assumption decreased from 4.00% to 3.10%.
- Covered payroll growth assumption decreased from 4.00% to 3.00%.
- Interest crediting rate assumption for cash balance accounts decreased from 6.25% to 6.00%.
- Mortality assumption was changed to the RP-2014 Mortality Table (2006 base table) with no age adjustment for males and a one-year age setback for females. Future mortality improvements from 2006 are anticipated with the Mortality Improvement Scale used by the Nebraska Public Employees Retirement System (NPERS).
- Retirement rates were adjusted to better reflect the actual experience.
- Termination rates were changed from unisex to sex-distinct and developed to reflect the actual experience.
- Refund of contributions assumption for terminated vested members was changed to 50% for all ages.

The impact on the actuarial liability due to the assumption changes listed above is amortized as a level-percent of payroll over a closed 25-year period, as recommended by the System's actuary and adopted by the Board. The changes to the actuarial assumptions increased the actuarial liability by $27.5 million and the total actuarial contribution rate by 3.855% of pay. The changes to the investment return and mortality assumptions had the most significant impact on the valuation results.

The impact of the assumption changes on the January 1, 2018 valuation results is summarized in the following table ($ millions):

	Old Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$447.1	$474.6	$27.5
Actuarial Value of Assets (AVA)	251.3	251.3	0.0
Unfunded AL (UAL)	$195.8	$223.3	$27.5
Funded Ratio	56.21%	52.95%	(3.26%)
Normal Cost Rate	9.525%	9.923%	0.398%
UAL Contribution Rate	17.676%	21.133%	3.457%
Total Actuarial Contribution Rate	27.201%	31.056%	3.855%
Contribution (Shortfall)/Margin	1.649%	(2.206%)	3.855%

Note: Numbers may not add due to rounding.

The actuarial valuation results provide a "snapshot" view of the System's financial condition on January 1, 2018. The unfunded actuarial liability (UAL) in the current valuation is $223 million, an increase of $26 million from last year's UAL of $198 million. The valuation results reflect net favorable experience for the past plan year as demonstrated by a lower UAL than expected, based on the actuarial assumptions used in the January 1, 2017 actuarial valuation. Favorable experience on the actuarial value of assets resulted in an experience gain of $1.1 million. There was also a net experience gain on liabilities of $2.0 million. Based on the contribution rates in the bargaining agreements, the actual contributions during 2017 were slightly higher than the actuarial contribution rate which decreased the unfunded actuarial liability by $0.9 million.

The System uses an asset smoothing method in the valuation process. As a result, the System's funded status and the actuarial contribution rate are based on the actuarial (smoothed) value of assets – not the pure market value. The estimated investment return, net of expenses, on the market value of assets during 2017 was 12.8%. The favorable investment experience during 2017 resulted in a rate of return on the actuarial value of assets of 8.5% for 2017, which is above the assumed return of 8.0% for that year (note the 7.5% investment return assumption applies prospectively). As a result, it generated an actuarial experience gain of $1.1 million. The market value of assets now exceeds the actuarial value of assets by $3.2 million or 1.3% of the market value. Actual market returns over the next few years will determine the rate at which the deferred investment gain is actually recognized. With the current deferred gain, a return of 6% on the market value of assets in 2018 would still result in a 7.5% return on the actuarial value of assets.

The change in the assets, liabilities, and contribution rate of the System over the last year are discussed in more detail in the following sections.

MEMBERSHIP

There were 1,222 active members in the 2018 valuation compared to 1,197 in the 2017 valuation, a 2.1% increase. The increase in the number of active members contributed to the increase in covered payroll of 2.7%. The following graph shows the number of active members in the valuation over the last ten years. The current active group count is at its highest in the last 10 years. When the number of active members increases, it has a positive influence on the System's funding and contribution rate. While the normal cost rate is unaffected by the size of the membership, the UAL contribution rate is favorably impacted by a larger group of active members and the resulting higher payroll Going forward, the UAL is amortized assuming covered payroll will grow at 3.0% per year. If total payroll grows more than 3.0%, the UAL payment is divided by payroll that is higher than expected, resulting in a lower UAL contribution rate.

The graph below also shows the portion of total actives covered by the legacy Final Average Pay Plan and the Cash Balance Plan (for employees hired on/after March 1, 2015). In the 2018 valuation, there were 333 members covered by the Cash Balance Plan, about 27% of the total active membership. In the January 1, 2017 valuation, the Cash Balance Plan covered about 18% of the total active group.

ASSETS

As of January 1, 2018, the System had total funds of $254.5 million, when measured on a market value basis. This was an increase of $14.7 million from the prior year's value of $239.8 million, and represents an approximate rate of return, net of expenses, of 12.8%.

The market value of assets is not used directly in the actuarial calculation of the System's funded status and the actuarial contribution rate. An asset valuation method is used to smooth the effects of market fluctuations. The actuarial value of assets is equal to the expected asset value (based on last year's actuarial value of assets, net cash flows and a rate of return equal to the actuarial assumed rate of 7.5%) plus 25% of the difference between the actual market value and the expected asset value. See Exhibit 2 for the detailed development of the actuarial value of assets as of January 1, 2018. The rate of return on the actuarial value of assets was 8.5%, resulting in an actuarial gain of $1.1 million.

The components of the change in the market value and actuarial value of assets are shown below:

	Market Value ($M)	Actuarial Value ($M)
Net Assets, January 1, 2017	$ 239.8	$ 246.2
City and Member Contributions	+ 20.3	+ 20.3
Benefit Payments and Refunds	- 35.4	- 35.4
Investment Gain/(Loss)	+ 29.8	+ 20.2
Net Assets, January 1, 2018	254.5	251.3
Estimated Rate of Return	12.8%	8.5%

The deferred investment gain that is not recognized as of January 1, 2018 is $3.2 million, compared with $6.4 million of deferred investment loss in last year's valuation. The unrecognized investment gain of $3.2 million will be reflected in the determination of the actuarial value of assets for funding purposes over time, to the extent it is not offset by future losses. This means that earning the assumed rate of investment return of 7.5% per year (net of investment expenses) on a market value basis will result in small actuarial gains on the actuarial value of assets in the future.

The unrecognized investment gain represents 1.3% of the market value of assets (compared to a deferred loss equal to 2.7% of the market value in the 2017 valuation). If the deferred gain was recognized immediately in the actuarial value assets, the UAL would decrease by $3.2 million to $220.1 million, the funded ratio would increase to 53.6%, the actuarial contribution rate would decrease from 31.056% to 30.723%, and the contribution shortfall would decrease to 1.873% of payroll.

A comparison of asset values on both a market and actuarial basis for the last six years is shown in the following table.

	January 1 ($M)					
	2013	2014	2015	2016	2017	2018
Actuarial Value of Assets	$236	$238	$242	$244	$246	$251
Market Value of Assets	$223	$240	$239	$232	$240	$255
Actuarial Value/Market Value	106%	99%	101%	105%	103%	99%
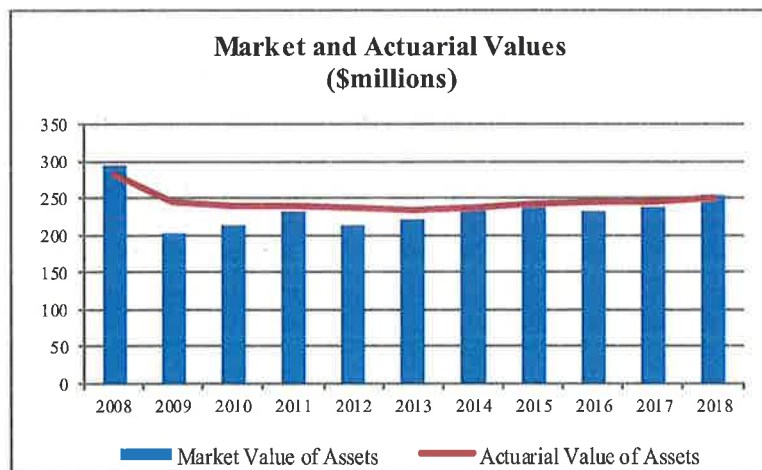
Market and Actuarial Values ($millions)

An asset smoothing method is used to mitigate the volatility in the market value of assets. By using a smoothing method, the actuarial (or smoothed) value can be either above or below the pure market value.

LIABILITIES

The first step in determining the actuarial contribution rate for the System is to calculate the liabilities for all expected future benefit payments. These liabilities represent the present value of future benefits (PVFB) expected to be earned by the current System members, assuming that all actuarial assumptions are realized. Thus, the PVFB reflects service and salary increases that are expected to occur in the future before the benefit becomes payable. The PVFB for the various types of benefits provided by the System can be found in the liabilities portion of the valuation balance sheet (see Exhibit 3).

The other critical measurement of System liabilities in the valuation process is the actuarial liability (AL). This is the portion of the PVFB that will not be paid by the future normal costs (i.e. it is the portion of the PVFB that is allocated to prior service periods). As of January 1, 2018, the AL for the System is $474.6 million.

The following chart compares the AL and System assets for the current and prior valuation:

	As of January 1	
	2018	2017
Actuarial Liability (AL)	$474,607,516	$443,771,621
Assets at Actuarial Value	$251,320,837	$246,234,597
Unfunded Actuarial Liability (AVA)	$223,286,679	$197,537,024
Funded Ratio (Actuarial Value)	53%	55%
Assets at Market Value	$254,532,138	$239,825,244
Unfunded Actuarial Liability (MVA)	$220,075,378	$203,946,377
Funded Ratio (Market Value)	54%	54%

Note that the funded ratio does not indicate whether or not the System assets are sufficient to settle benefits earned to date. The funded ratio by itself also may not be indicative of future funding requirements.

EXPERIENCE FOR THE 2017 PLAN YEAR

The difference between the actuarial liability (AL) and the actuarial value of assets at the same date is referred to as the unfunded actuarial liability (UAL). Benefit improvements, experience gains/losses, changes in the actuarial assumptions or methods, and actual contributions made will impact the amount of the UAL.

Actuarial gains (or losses) result from actual experience that is more (or less) favorable than anticipated based on the actuarial assumptions. These "experience" (or actuarial) gains or losses are reflected in the UAL and are measured as the difference between the expected UAL and the actual UAL, taking into account any changes due to assumptions/methods or benefit provision changes. During 2017, the net experience was favorable (a lower UAL than expected). There was an actuarial gain for 2017 of $1.1 million on the actuarial value of assets and an actuarial gain of $2.0 million on liabilities. The largest source of gain for the System's liabilities was favorable mortality experience, due to a larger number of retiree deaths than expected.

The change in the UAL between January 1, 2017 and January 1, 2018 is shown below (in millions):

Unfunded Actuarial Liability, January 1, 2017	197.5
· Expected change in UAL	2.5
· Contribution above actuarial rate	(0.9)
· Investment experience	(1.1)
· Demographic experience	(2.0)
· Assumption changes	27.5
· Other experience	(0.2)
Unfunded Actuarial Liability, January 1, 2018	223.3

CONTRIBUTION LEVELS

The actuarial contribution rate of the System is composed of two parts:

(1) Normal cost (which is the allocation of costs attributed to the current year's membership service) and,
(2) Amortization payment on the unfunded actuarial liability.

The normal cost rate is independent of the System's funded status and represents the cost, as a percent of payroll, of the benefits provided by the System which is allocated to the current year of service. The total normal cost for the System is 9.923% of pay, or $6.6 million this year. The normal cost rate represents the long-term cost of the benefit structure for the current active members.

The System's total actuarial contribution rate (payable as a percentage of member payroll) increased by 3.316% of pay, to 31.056% in the January 1, 2018 valuation, from 27.740% in the January 1, 2017 valuation. The primary components of the change in the actuarial contribution rate are shown in the following table:

	Rate	
Total Actuarial Contribution Rate, January 1, 2017	27.740	%
· Actuarial (Gain) / Loss - Investment Experience	(0.106)	
· Actuarial (Gain) / Loss - Demographic Experience	(0.203)	
· Contributions Above The Actuarial Rate	(0.087)	
· Change in Normal Cost Rate	(0.196)	
· Payroll Growth Lower than Expected	0.076	
· Assumption Changes	3.855	
· Other Experience	(0.023)	
Total Actuarial Contribution Rate, January 1, 2018	31.056	%

As the table above shows, the actuarial contribution rate increased from 27.740% to 31.056%, mainly due to the new set of assumptions, adopted by the Board as a result of the most recent experience study. For the current valuation, the total actuarial contribution rate for 2018 is 31.056% of pay (9.923% normal cost + 21.133% UAL payment). The scheduled contributions for the year are 28.850%, resulting in a contribution shortfall of 2.206%. This indicates that the target date for full funding will not occur if all actuarial assumptions are met.

COMMENTS

There have been several changes to the actuarial assumptions used in this valuation as a result of the four-year experience study completed in February 2018, the most significant of which were decreasing the investment return assumption from 8.0% to 7.5% and moving to a more recent mortality table. The changes to the actuarial assumptions increased the actuarial liability by $27.5 million and the total actuarial contribution rate by 3.855% of pay.

As of January 1, 2018, 333 out of 1,222 active members are covered under the Cash Balance benefit structure, or about 27%. Although nearly 30% of active members are covered by the Cash Balance Plan, the majority of the actuarial liability is attributable to the legacy plan (the Final Average Pay Plan). It will take many years before the cash balance plan design has a significant impact on the System's liabilities and costs. We expect to continue to see growth in the number of active members covered by the cash balance benefit structure, but the System's liabilities will continue to reside with members in the legacy benefit structure (final average pay plan) for many years.

The results of this valuation indicate that the fixed contribution rates in the current bargaining agreements are 2.206% lower than the total actuarial contribution rate. The contribution shortfall is totally attributable to the change in actuarial assumptions. Absent that change, there would have been a contribution margin of 1.649% of pay. The contribution shortfall should not be misunderstood. It is an indication that, if all assumptions are met in the future, the System will not reach full funding at the date anticipated in the System's funding policy (end of the amortization periods). However, it does not necessarily mean the System will never be fully funded. With the new benefit structure for members hired after March 1, 2015, and a corresponding decrease in the normal cost rate, a projection of future valuation results is necessary in order to quantify the expected date the System will reach full funding. Such a project is outside the scope of this assignment, but we strongly encourage the System to perform such modeling to assist the Board and other interested parties in the evaluation of the long-term financial health of the System. The model can also be used perform important analysis of the various risks related to funding the System.

The return on the market value of assets in 2017 was 12.8%. As a result, the deferred investment loss of $6.4 million that existed on January 1, 2017 has been eliminated and there is now a deferred investment gain of $3.2 million. The funded ratio of the system, on a market value basis, is 54% in the January 1, 2018 actuarial valuation. While the System's financial health in future years will be negatively impacted by the contribution shortfall and positively impacted by changes to the benefit structure, the net impact on the System's long-term funding cannot be quantified without performing an open group projection of future valuation results. Such analysis was not performed because it is outside the regular scope of services requested by the Board.

As mentioned earlier in this report, the System uses an asset smoothing method in the actuarial valuation. While this is a very common procedure for public retirement systems, it is important to be aware of the potential impact of the unrecognized investment experience. The System currently has a deferred gain of $3.2 million. It is valuable to compare the key valuation results from the 2018 valuation using both the actuarial and market value of assets (see following table).

	$ Millions	
	Using Actuarial Value of Assets	Using Market Value of Assets
Actuarial Liability	$474.6	$474.6
Asset Value	251.3	254.5
Unfunded Actuarial Liability	$223.3	$220.1
Funded Ratio	53.0%	53.6%
Normal Cost Rate	9.923%	9.923%
UAL Contribution Rate	21.133%	20.800%
Total Actuarial Contribution Rate	31.056%	30.723%
Employee Contribution Rate	10.075%	10.075%
City Contribution Rate	18.775%	18.775%
Contribution (Shortfall)/Margin	(2.206%)	(1.873%)

THE CITY OF OMAHA EMPLOYEES' RETIREMENT SYSTEM

PRINCIPAL VALUATION RESULTS

	January 1, 2018	January 1, 2017	% Chg
MEMBERSHIP			
1. Active Membership			
- Number of Members:			
Hired before March 1, 2015	889	985	(9.7)
Hired on or after March 1, 2015	333	212	57.1
Total	1,222	1,197	2.1
- Projected Payroll for Upcoming Fiscal Year	$72,754,142	$70,873,306	2.7
- Average Projected Pay	$59,537	$59,209	0.6
- Average Attained Age	45.6	46.2	(1.3)
- Average Entry Age	36.7	36.7	0.0
2. Inactive Membership			
- Number of Retirees / Beneficiaries	1,364	1,321	3.3
- Number of Disabled Members	101	109	(7.3)
- Number of Deferred Vested Members	81	76	6.6
- Average Annual Benefit	$23,746	$23,323	1.8
- Number of Participants Due a Refund	52	36	44.4
ASSETS AND LIABILITIES			
1. Net Assets			
- Market Value	$254,532,138	$239,825,244	6.1
- Actuarial Value	251,320,837	246,234,597	2.1
2. Projected Liabilities	$529,259,210	$493,356,506	7.3
3. Actuarial Liability	474,607,516	443,771,621	6.9
4. Unfunded Actuarial Liability	$223,286,679	$197,537,024	13.0
5. Funded Ratios			
Actuarial Value Assets / Actuarial Liability	52.95%	55.49%	(4.6)
Market Value Assets / Actuarial Liability	53.63%	54.04%	(0.8)
CONTRIBUTIONS			
1. Normal Cost Rate	9.923%	9.721%	2.1
2. UAL Contribution Rate	21.133%	18.019%	17.3
3. Total Actuarial Contribution Rate (1) + (2)	31.056%	27.740%	12.0
4. Employee Contribution Rate	10.075%	10.075%	0.0
5. City Contribution Rate Per Ordinance	18.775%	18.775%	0.0
6. Contribution (Shortfall)/Margin (4) + (5) - (3)	(2.206%)	1.110%	(298.7)

EXHIBIT 1

SUMMARY OF FUND ACTIVITY
(Market Value Basis)

For Year Ended December 31, 2017

Assets at January 1, 2017	$	239,825,244
Receipts:		
City Contributions		13,227,230
Employee Contributions		7,106,189
Investment Earnings, Net of Expenses		29,803,718
Total Receipts		50,137,137
Disbursements:		
Benefit Payments		34,609,339
Refund of Contributions		815,017
Administrative Expenses		5,887
Total Disbursements		35,430,243
Assets as of December 31, 2017	$	254,532,138
Annualized Net Yield		12.8%

EXHIBIT 2

DETERMINATION OF ACTUARIAL VALUE OF ASSETS

The actuarial value of assets is used to minimize the impact of annual fluctuations in the market value of investments on the contribution rate. The current asset valuation method is called the "Expected +25% Method."

The "expected value" of assets is determined by applying the investment return assumption to last year's actuarial value of assets and the net difference of receipts and disbursements for the year. The actual market value is compared to the expected value and 25% of the difference (positive or negative) is added to the expected value to arrive at the actuarial value of assets for the current year.

1.	Actuarial Value of Assets as of January 1, 2017		$	246,234,597
2.	Actual Receipts / Disbursements			
	a.	Total Contributions		20,333,419
	b.	Benefit Payments/Other		(35,424,356)
	c.	Net Change		(15,090,937)
3.	Expected Actuarial Value of Assets as of January 1, 2018 $[(1) * 1.08] + [(2c) * 1.08^{\frac{1}{2}}]$			250,250,403
4.	Market Value of Assets as of January 1, 2018			254,532,138
5.	Excess of Market Value over Expected Actuarial Value as of January 1, 2018			4,281,735
6.	Preliminary Actuarial Value of Assets as of January 1, 2018 [(3) + 25% of (5)]			251,320,837
7.	20% Calculation of Corridor			
	a.	80% of (4)		203,625,710
	b.	120% of (4)		305,438,566
8.	Final Actuarial Value of Assets as of January 1, 2018 (6) but not < (7a) nor > (7b)		$	251,320,837
9.	Rate of Return on Actuarial Value of Assets			8.5%

EXHIBIT 2 (continued)

A historical comparison of the market and actuarial value of assets is shown below:

Date	Market Value of Assets (MVA)	Actuarial Value of Assets (AVA)	AVA / MVA
1/1/2008	$294,658,022	$283,243,750	96.13%
1/1/2009	204,452,506	245,343,007	120.00%
1/1/2010	213,219,632	240,109,413	112.61%
1/1/2011	232,346,583	240,291,310	103.42%
1/1/2012	215,434,784	236,741,347	109.89%
1/1/2013	223,233,088	235,591,941	105.54%
1/1/2014	240,342,815	237,579,690	98.85%
1/1/2015	238,730,446	242,248,074	101.47%
1/1/2016	232,157,235	243,516,453	104.89%
1/1/2017	239,825,244	246,234,597	102.67%
1/1/2018	254,532,138	251,320,837	98.74%
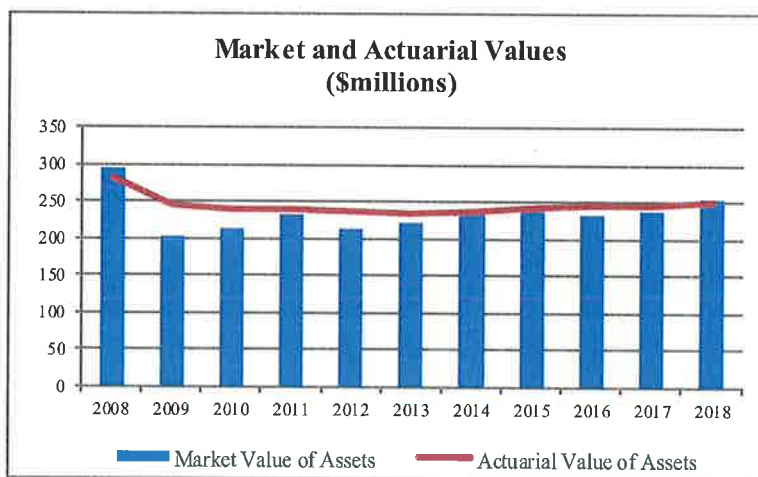
Market and Actuarial Values ($millions)

EXHIBIT 3

ACTUARIAL BALANCE SHEET

An actuarial statement of the status of the System in balance sheet form as of January 1, 2018 is as follows:

Assets

Current assets (actuarial value)	$	251,320,837
Present value of future normal costs		54,651,694
Present value of future employer contributions to fund unfunded actuarial liability		223,286,679
Total Assets	$	529,259,210

Liabilities

Present value of future retirement benefits for:

Active employees	$	143,462,931	
Retired employees, contingent annuitants and spouses receiving benefits		330,910,327	
Deferred vested employees		6,242,680	
Inactive employees due refunds		231,733	
Inactive employees – disabled		20,641,386	
Total		$	501,489,057
Present value of future death benefits payable upon death of active members			3,378,164
Present value of future benefits payable upon termination of active members			14,437,584
Present value of future benefits payable upon disability of active members			9,954,405
Total Liabilities		$	529,259,210

EXHIBIT 4

UNFUNDED ACTUARIAL LIABILITY

As of January 1, 2018

The actuarial liability is the portion of the present value of future benefits which will not be paid by future normal costs, i.e., the portion allocated to past years of service. The actuarial value of assets is subtracted from the actuarial liability to determine the unfunded actuarial liability.

1.	Present Value of Future Benefits	$	529,259,210
2.	Present Value of Future Normal Costs		54,651,694
3.	Actuarial Liability (1) – (2)		474,607,516
4.	Actuarial Value of Assets		251,320,837
5.	Unfunded Actuarial Liability (3) – (4)	$	223,286,679
6.	Funded Ratio (4) / (3)		52.95%

EXHIBIT 5

SCHEDULE OF AMORTIZATION BASES

The System amortizes the unfunded actuarial liability (UAL) using a "layered" approach for the UAL where the UAL as of January 1, 2016 (initial base) is amortized over a closed amortization period of 25 years. Changes to the UAL resulting from changes in the set of actuarial assumptions are amortized over an appropriate period, as determined by the Board of Trustees in consultation with the actuary. The increase in the UAL in the 2018 valuation is amortized over 25 years. Changes to the UAL in subsequent years that result from actual experience that is different than expected, based on the actuarial assumptions, are set up as a new amortization base with payments determined as a level percentage of payroll over a closed 20-year period beginning on that valuation date. The total UAL payment is the sum of the amortization payments on each of the amortization bases.

Note that although an actuarial contribution rate is determined for the City of Omaha Employees' Retirement System, the System is funded based on fixed contribution rates specified in the various collective bargaining agreements.

Amortization Bases	Original Amount	January 1, 2018 Remaining Years	Year of Last Payment	Outstanding Balance as of January 1, 2018	Annual Contribution (mid-year)
2016 Initial UAL Base	$ 193,616,559	23	2040	$ 198,951,099	$ 13,793,493
2017 Experience Base	1,111,921	19	2036	1,116,940	87,151
2018 Assumption Changes	27,470,165	25	2042	27,470,165	1,815,625
2018 Experience Base	(4,251,525)	20	2037	(4,251,525)	(321,013)
Total				$ 223,286,679	$ 15,375,256

EXHIBIT 6

DEVELOPMENT OF

2018 ACTUARIAL CONTRIBUTION RATE

The actuarial cost method used to determine the required level of annual contributions to support the expected benefits is the Entry Age Normal Cost Method. Under this method, the total cost is comprised of the normal cost rate and the unfunded actuarial liability payment. The System is financed by fixed contribution rates from the employees and the City as set out in the bargaining agreements with the various employee groups.

1. (a)	Normal Cost	$	6,578,160
(b)	Expected Payroll in 2018 for Current Actives	$	66,290,502
(c)	Normal Cost Rate		
	(a) / (b)		9.923%
2.	Unfunded Actuarial Liability at Valuation Date	$	223,286,679
3.	Unfunded Actuarial Liability Payment	$	15,375,256
4.	Total Projected Payroll for 2018	$	72,754,142
5.	Unfunded Actuarial Liability Payment as Percent of Pay (3) / (4)		21.133%
6.	Total Actuarial Contribution Rate (1c) + (5)		31.056%
7.	Employee Contribution Rate		10.075%
8.	City Contribution Rate		18.775%
9.	Contribution (Shortfall)/Margin (7) + (8) - (6)		(2.206%)

EXHIBIT 7

CALCULATION OF ACTUARIAL GAIN/(LOSS)

For Plan Year Ending December 31, 2017

Liabilities

1.	Actuarial liability as of January 1, 2017	$	443,771,621
2.	Normal cost for 2017		6,229,103
3.	Interest at 8.00% on (1) and (2) to December 31, 2017		36,000,058
4.	Benefit payments during 2017		(35,424,356)
5.	Interest on benefit payments		(1,389,715)
6.	Assumption changes		27,470,165
7.	Expected actuarial liability as of December 31, 2017	$	476,656,876
8.	Actuarial liability as of December 31, 2017	$	474,607,516

Assets

9.	Actuarial value of assets as of January 1, 2017	$	246,234,597
10.	Contributions during 2017		20,333,419
11.	Benefit payments during 2017		(35,424,356)
12.	Interest at 8.00% on (9), (10) and (11) to December 31, 2017		19,106,743
13.	Expected actuarial value of assets as of December 31, 2017	$	250,250,403
14.	Actual actuarial value of assets as of December 31, 2017	$	251,320,837

Gain / (Loss)

15.	Expected unfunded actuarial liability (7) – (13)	$	226,406,473
16.	Actual unfunded actuarial liability (8) – (14)		223,286,679
17.	Actuarial Gain / (Loss) (15) – (16)		3,119,794
18.	Actuarial Gain / (Loss) on Actuarial Assets (14) – (13)		1,070,434
19.	Actuarial Gain / (Loss) on Actuarial Liability (7) – (8)	$	2,049,360

EXHIBIT 8

ANALYSIS OF EXPERIENCE

The purpose of conducting an actuarial valuation of a retirement plan is to estimate the costs and liabilities for the benefits expected to be paid from the plan, to determine the annual level of contributions for the current plan year that should be made to support these benefits, and finally, to analyze the plan's experience. The costs and liabilities of this retirement plan depend not only upon the benefit formula and plan provisions but also upon factors such as the investment return on the system assets, mortality rates among active and retired members, withdrawal and retirement rates among active members, and rates at which salaries increase.

The actuarial assumptions employed as to these and other contingencies in the current valuation are set forth in Appendix B of this report.

Since the overall results of the valuation will reflect the choice of assumptions made, periodic studies of the various components comprising the plan's experience are conducted in which the experience for each component is analyzed in relation to the assumption used for that component (called an experience study). This summary is not intended to be an actual "experience study" but rather an analysis of sources of gain and loss in the past plan year.

Gain/(Loss) By Source

The System experienced a net actuarial gain on liabilities of $2,049,000 during the plan year ended December 31, 2017, and an actuarial gain on assets of $1,070,000. The total actuarial gain was $3,119,000. The major components of this aggregate actuarial experience are shown below:

Liability Sources		Gain/(Loss)
Salary Increases	$	638,000
Mortality		2,589,000
Terminations		(528,000)
Retirements		(579,000)
Disability		(183,000)
New Entrants/Rehires		(354,000)
Disabled Retiree Conversions*		246,000
Miscellaneous		220,000
Total Liability Gain/(Loss)	$	2,049,000
Asset Gain/(Loss)	$	1,070,000
Total Actuarial Gain/(Loss)	$	3,119,000

* Upon reaching age 65, disabled members are converted from disability retirement to service retirement and their benefits are recalculated.

SECTION II

OTHER INFORMATION

In this section, we provide some historical information regarding the funding progress of the system. These exhibits retain some of the information that used to be required for accounting purposes and are included because they provide relevant information on the System's historical funding.

EXHIBIT 9

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ending	Annual Required Contribution* (a)	Total Employer Contribution* (b)	Percentage of ARC Contributed* (b) / (a)
12/31/2005	$ 6,877,913	$ 4,500,192	65.43%
12/31/2006	6,213,801	4,145,033	66.71%
12/31/2007	8,883,617	4,975,039	56.00%
12/31/2008	9,212,669	5,374,082	58.33%
12/31/2009	12,893,331	5,310,754	41.19%
12/31/2010	14,149,386	5,717,610	40.41%
12/31/2011	14,564,847	6,618,110	45.44%
12/31/2012	15,658,045	7,216,050	46.09%
12/31/2013	17,406,168	7,194,482	41.33%
12/31/2014	17,162,883	12,326,643	71.82%
12/31/2015	14,676,786	12,401,231	84.50%
12/31/2016	11,794,456	12,779,968	108.36%
12/31/2017	12,383,422	13,227,230	106.81%

* Information prior to 2011 was provided by the prior actuary and has not been reviewed or verified by Cavanaugh Macdonald Consulting.

Note: Although an actuarial contribution rate is calculated in the valuation, the system is funded by fixed contribution rates set out in the bargaining agreements for the individual employee groups.

EXHIBIT 10

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date[1]	Actuarial Value of Assets (a)	Actuarial Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (P/R) (c)	UAAL as a Percentage of Covered P / R [(b-a)/c]
12/31/2006	$292,000,000	$361,700,000	$ 69,700,000	80.7%	$48,200,000	144.6%
12/31/2007	294,700,000	369,000,000	74,300,000	79.9%	54,000,000	137.6%
12/31/2008	204,500,000	387,700,000	183,200,000	52.7%	56,400,000	324.8%
12/31/2009	213,200,000	402,800,000	189,600,000	52.9%	55,700,000	340.4%
12/31/2010	232,400,000	414,500,000	182,100,000	56.1%	56,700,000	321.2%
1/1/2011	240,291,310	409,442,601	169,151,291	58.7%	59,235,591	285.6%
1/1/2012	236,741,347	420,810,359	184,069,012	56.3%	62,825,685	293.0%
1/1/2013	235,591,941	436,270,409	200,678,468	54.0%	63,327,394	316.9%
1/1/2014	237,579,690	442,754,113	205,174,423	53.7%	63,413,206	323.6%
1/1/2015	242,248,074	431,160,038	188,911,964	56.2%	64,876,227	291.2%
1/1/2016	244,543,841	437,133,012	192,589,171	55.9%	69,005,865	279.1%
1/1/2017	246,234,597	443,771,621	197,537,024	55.5%	70,873,306	278.7%
1/1/2018	251,320,837	474,607,516	223,286,679	53.0%	72,754,142	306.9%

[1] Results prior to 2011 were provided by the prior actuary and were reported at the end of the year rather than the valuation date.

Note: the investment return assumption was changed from 8.0% to 7.5% in the 2018 valuation.

APPENDIX A

SUMMARY OF PLAN PROVISIONS

Effective Date:
    Section 22 - 21

January 1, 1949

Active Member:
    Section 22 – 24 and 25

All City employees except: policemen, firemen, persons paid on a contractual or fee basis, seasonal, temporary and part-time employees, and elected officials who do not make written application.

Final Average Compensation (FAC):
    Section 22 - 32

Highest 78 pay periods in the employee's last 130 pay periods of employment divided by three for members who are within five years of normal retirement as of March 1, 2015 under the eligibility criteria set forth in the 2009 through 2012 labor agreements; or the last 130 pay periods divided by five for all other employees. Minimum FAC, regardless of retirement date, shall never be less than the FAC determined as of 2/28/2015 (highest consecutive 26 pay periods in 130 pay periods prior to 2/28/2015).

Member Contributions:
    Section 22 – 26(a)

Each member will contribute 10.075% of total compensation.

City of Omaha Contributions:
    Section 22 – 26(e)

The City will contribute a percentage of each member's total compensation as shown in the following table.

Year	Percent Contributed
2013	13.775%
2014	17.775%
2015	18.775%

Service Credits
    Section 22 – 28 and 29

The member shall receive membership service credit for each full pay period of employment. Intervening periods of military service in time of emergency shall be counted, provided the member is honorably discharged and returns to work within 90 days after such discharge.

Membership credits shall be earned by those receiving a disability pension. However, the total credited service will not exceed 30, unless more than 30 years were earned as an active member.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Service Retirement Eligibility:
Section 22 - 30

Members who are within five years of normal retirement as of March 1, 2015 under the eligibility criteria set forth in the 2009 through 2012 labor agreement will remain eligible for a service retirement if (a) they are age 60 with five years of service or (b) meet the Rule of 80 with a minimum age of 50. A member is eligible for a service retirement after reaching age 55 with five years of service, but the pension is reduced 8% per year for years prior to age 60.

Members who are more than five but less than ten years of normal retirement as of March 1, 2015 under the eligibility criteria set forth in the 2009 through 2012 labor agreement are eligible to retire after age 55 if their age plus service is 85 or more (Rule of 85). Otherwise, a member is eligible to retire after age 57 with five years of service, but the pension is reduced 8% per year for years prior to age 62.

Members who are not within ten years of normal retirement as of March 1, 2015 under the eligibility criteria set forth in the 2009 through 2012 labor agreement, are eligible to retire after age 55 if their age plus service is 85 or more (Rule of 85). Otherwise, such member is eligible to retire after age 60 with five years of service, but the pension is reduced 8% per year for years prior to age 65.

Members who are hired on or after March 1, 2015 are eligible to retire after age 55 with ten years of service.

Service Retirement Pension:
Section 22 - 32

For members hired before March 1, 2015, a monthly pension equal to 2.25% of Final Average Compensation times years of service during and before 2014, plus 1.90% for years of service during and after 2015.

For members hired on or after March 1, 2015, the system shall establish and maintain a "cash balance account" for each employee. The cash balance account shall be equal to the sum of the employee's pay credits, interest credits and dividends, which are explained further in the following paragraphs.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Interest Credits and Dividends: On the last day of each plan year, each cash balance account shall receive an interest credit equal to 4.0% of the balance at the beginning of the plan year. Additionally, each account may be credited with a dividend equal to 75% of the System's investment return, on a market value basis, that is over 7.0% on a rolling five-year return. The dividend is capped at 3.0% until January 1, 2020.

Pay Credits: On the last day of each plan year, each cash balance account shall receive a pay credit equal to the following percentages of the member's pensionable earnings for the plan year:

Years of Service	Percentage
Less Than 8	13.0%
8 – 15	14.0%
16 – 23	15.0%
24 or More	16.0%

Monthly Benefit: At retirement, a member may elect to receive benefit payments as a single life annuity, life annuity with 10 years certain, life annuity with 15 years certain, Joint and 50% Survivor, Joint and 75% Survivor, or Joint and 100% Survivor. The annuity conversion factor shall be based on 5% interest and the RP 2000 Mortality Table Projected to 2034 with a male/female blend of 67%/33%.

Disability Benefits:

1. Non-Service Related
    Section 22 - 35

An employee who sustains an injury or illness not in the line of duty and as a result becomes unfit for active duty shall be granted a non-service-connected disability retirement of 1.50% multiplied by the employee's years of service multiplied by their Final Average Compensation. Members who were hired before March 1, 2015 are eligible for this benefit with five years of service. Members who were hired on or after March 1, 2015 are eligible for this benefit with ten years of service.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

2. Service-Related
   Section 22 - 35

An employee who is a member of the system who sustains an injury or illness in the line of duty and as a result becomes unfit for active duty shall be granted a service-connected disability retirement of 1.75% multiplied by the employee's years of service multiplied by their Final Average Compensation. This benefit is available only if the member has served a minimum of six months of service.

Spouse's Pension:

1. Death of Active Member
   Section 22 - 36

For members hired <u>before</u> March 1, 2015, a monthly pension equal to 75% of the member's accrued pension is paid to the surviving spouse until death or remarriage. The member must have had five years of service or had a service-connected death and six months of service.

For members hired <u>on or after</u> March 1, 2015, a lump sum payment of the member's full cash balance account if the member had ten or more years of service prior to death. If the member had less than ten years of service prior to death, then the surviving spouse is eligible to receive a lump sum payment equal to the member's contributions with 4.0% interest.

2. Death of a Member Eligible for
   Retirement or Death of Retired Member
   Section 22 - 36

For members hired <u>before</u> March 1, 2015, if the surviving spouse was legally married to the member for at least one year, then they shall be entitled to 75% of the pension the member was receiving or was eligible to receive at the time of death. Upon the spouse's remarriage, all benefits cease.

Children's Pension:
   Section 22 - 36

For members hired <u>before</u> March 1, 2015, upon the death of the active or retired member, the following benefit will be paid to the surviving children until age 18 or prior to death or marriage, except that if a child is totally disabled, the full pension continues until the cessation of total disability or dependency for support whichever occurs first:

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Number of Dependent Children	Percentage of Accrued Benefit
1	5%
2	10%
3	15%
4 or more	20%

Lump Sum Death Benefits:

1. Active Member without Eligible Dependents
   Section 22 - 37

   Accumulated member's contributions, plus $5,000.

2. Retired Member without Eligible Dependents
   Section 22 - 37

   Accumulated member's contribution less previous pension payments made, plus $5000.

3. Active Member with Eligible Dependents
   Section 22 - 37

   $5,000

4. Retired Member with Eligible Dependents
   Section 22 - 37

   $5,000

Vesting:
   Section 22 – 39

For members who were hired <u>before</u> March 1, 2015, upon severance of employment with less than five years of service and prior to obtaining eligibility under Section 22 – 30, a refund of such member's accumulated contributions, including credited interest, will be paid.

For members who were hired <u>on or after</u> March 1, 2015, upon severance of employment with less than ten years of service and prior to obtaining eligibility under Section 22 – 30, a refund of such member's accumulated contributions, including 4.0% interest, will be paid.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Section 22 – 40

For members who were hired <u>before</u> March 1, 2015, upon severance of employment with more than five years of service and prior to obtaining eligibility for retirement, the member may elect, in lieu of receiving a refund of contributions, to receive a monthly pension, reduced for early retirement if applicable. Such deferred pension shall be based on service credited to the date of severance.

For members who were hired <u>on or after</u> March 1, 2015, upon severance of employment with more than ten years of service and prior to obtaining eligibility for retirement, the member may elect, in lieu of receiving a refund of contributions, to leave their contributions in the System and thereby be eligible for a deferred service retirement pursuant to Section 22 – 40.

Supplemental Pension:
Section 22 – 123

Retirees (including widows, widowers and children) receive a supplemental pension (Cost of Living Adjustment – COLA) after five years equal to the lesser of 3% or $50 per month. The COLA is granted for the full remaining period that benefits are payable. No COLAs will be available for members who retire after January 28, 1998.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Cost Method

Valuation of the System uses the *"entry age-normal"* cost method. Under this actuarial method, the value of future costs attributable to future employment of participants is determined. This is called present value of future normal costs. The following steps indicate how this is determined for benefits expected to be paid upon normal retirement.

1. The expected pension benefit at normal retirement is determined for each participant.

2. A normal cost, as a level-percent of pay, is determined for each participant assuming that such level percent is paid from the employee's entry age into employment to his normal retirement. This normal cost is determined so that its accumulated value at normal retirement is sufficient to provide the expected pension benefits.

3. The sum of the normal costs for all participants for one year determines the total normal cost of the System for one year.

4. The value of future payments of normal cost in future years is determined for each participant based on his years of service to normal retirement age.

5. The sum of the value of future payments of normal cost for all participants determines the present value of future normal costs.

The value of future costs attributable to past employment of participants, which is called the actuarial liability, is equal to the present value of benefits less the present value of future normal costs. The unfunded actuarial liability is equal to the excess of the actuarial liability over assets.

As experience develops with the System, actuarial gains and losses result. These actuarial gains and losses indicate the extent to which actual experience is deviating from that expected on the basis of the actuarial assumptions. In each year, as they occur, actuarial gains and losses are recognized in the unfunded actuarial liability as of the valuation date.

Actuarial Value of Assets

The actuarial value of assets is equal to the expected asset value (based on last year's actuarial value of assets, net cash flows and a rate of return equal to the actuarial assumed rate of 7.5%) plus 1/4 of the difference between the actual market value and the expected asset value. The actuarial value of assets cannot exceed 120% or fall below 80% of the market value of assets.

Unfunded Actuarial Liability Amortization Method

The unfunded actuarial liability (UAL) is funded on a "layered" basis, with the initial base being funded as a level-percent of payroll over a 25-year closed period that began January 1, 2016. The base attributable to the increase in the UAL due to the change in assumptions in the 2018 valuation is amortized over a closed 25-year period. In addition, a new base is created in each valuation which is equal to the unexpected change in the UAL from actual versus expected experience, as measured in that valuation. Each experience base is funded as a level percent of payroll over a 20-year closed period.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

Investment Return: 7.50% per year, net of investment expenses.

Price Inflation: 2.50% per year, net of investment expenses.

Interest Credited to
Cash Balance Accounts: 6.00% per year

Individual Salary Increases:

	Annual Rate of Increase For Sample Years			
Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.60%	4.90%	8.00%
5	2.50%	0.60%	1.40%	4.50%
10	2.50%	0.60%	0.90%	4.00%
15	2.50%	0.60%	0.65%	3.75%
20	2.50%	0.60%	0.15%	3.25%
25	2.50%	0.60%	0.15%	3.25%
30	2.50%	0.60%	0.15%	3.25%
35+	2.50%	0.60%	0.00%	3.10%

Payroll Growth Assumption: 3.00%

Service Retirement Age: **Members within 5 Years of Unreduced Retirement Eligibility as of March 1, 2015**

	Eligible for Unreduced Retirement	
Age	1st Year Eligible	Subsequent Years
50-53	35%	25%
54-55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64	25%	25%
65-69	50%	30%
70	100%	100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 3.50% per year from age 55 to 59.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

**Members within 6-10 Years of Unreduced
Retirement Eligibility as of March 1, 2015**

	Eligible for Unreduced Retirement	
Age	1st Year Eligible	Subsequent Years
55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64		25%
65-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, arc assumed to retire at a rate of 3.50% per year from age 57 to 61.

**Members more than 10 Years from Unreduced
Retirement Eligibility as of March 1, 2015**

	Eligible for Unreduced Retirement	
Age	1st Year Eligible	Subsequent Years
55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64	25%	25%
65	50%	30%
66-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 3.50% per year from age 60 to 64.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

Members Hired on or After March 1, 2015

Age	Probability Of Retirement
55-59	5%
60-61	7%
62-64	20%
65	35%
66	25%
67-69	20%
70	100%

Deferred vested members are assumed to begin receiving benefits at age 60.

Decrement Timing

Middle of year

Mortality:

Active Members

RP-2014 Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the ultimate projection scale used by the Nebraska Public Employees Retirement System

Pensioners

RP-2014 Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the ultimate projection scale used by the Nebraska Public Employees Retirement System

Disabled

RP-2014 Disabled Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the MP-2016 scale

Disability:

Age	Annual Rate
20	0.11%
30	0.14%
40	0.19%
50	0.41%
60	1.48%

20% of disabilities are assumed to be service-connected.

Percent Married at Death or Retirement:

75%

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

Spouse Age Difference: Husbands assumed to be three years older than wives.

Number of Children per Married Member: 0

Termination:

	Annual Rate	
Years of Service	**Male**	**Female**
0	11.00%	15.00%
1	10.00%	14.00%
2	8.25%	12.00%
3	7.25%	10.50%
4	6.25%	9.00%
5	5.50%	8.00%
6	5.00%	7.00%
7	4.50%	6.00%
8	4.25%	5.00%
9	4.00%	4.50%
10	3.75%	4.30%
11	3.50%	4.00%
12	3.25%	3.80%
13	3.00%	3.50%
14	2.75%	3.00%
15	2.50%	2.50%
16	2.25%	2.00%
17+	2.00%	2.00%

Vested Terminations Electing Refund: 50% of members with less than 20 years of service.

For members hired on or after March 1, 2015, members are assumed to take the more valuable of a lump sum or the present value of an annuity at age 60.

APPENDIX C

HISTORICAL SUMMARY OF MEMBERSHIP

The following table displays selected historical data as available.

Valuation Date 1-Jan	Total Count	Active Members						Number		
		Number	Age	Entry Age	Average Service	Annual Pay ($)*	Pay Increase	Disabled	Deferred Vested	Retired
2009	2,440	1,116	47.3	36.4	10.9	47,495	2.21%	122	81	1,121
2010	2,456	1,116	47.8	37.1	10.8	49,667	4.57%	124	83	1,133
2011	2,493	1,130	47.4	36.9	10.5	49,030	(1.28%)	120	82	1,161
2012	2,541	1,156	47.3	36.8	10.5	50,335	2.66%	121	77	1,187
2013	2,580	1,150	46.9	36.7	10.2	50,842	1.01%	122	75	1,233
2014	2,563	1,116	47.1	36.7	10.4	51,501	1.30%	121	77	1,249
2015	2,617	1,143	46.6	36.5	10.1	50,774	(1.41%)	114	74	1,286
2016	2,657	1,194	46.5	36.7	9.8	52,439	3.28%	112	77	1,274
2017	2,703	1,197	46.2	36.7	9.5	54,347	3.64%	109	76	1,321
2018	2,768	1,222	45.6	36.7	8.9	54,718	0.68%	101	81	1,364

* Annual Pay is the actual pay reported for the prior plan year.

MEMBERSHIP DATA FOR VALUATION
(Hired before March 1, 2015)

The summary of member characteristics presented below covers the membership as of January 1, 2018. The schedules at the end of the report show the distribution of the various member groups by present age, along with other pertinent data.

Total number of members in valuation:

(a)	Active members	889
(b)	Deferred vested members	81
(c)	Terminated members due a refund	20
(d)	Disabled members	101
(e)	Retired members, spouses and children receiving benefits	1,364
(f)	Total members in valuation	2,455

Average age of members in valuation:

(a)	Active members	
	Attained Age	48.1
	Hire Age	36.7
(b)	Deferred vested members	48.5
(c)	Disabled members	64.3
(d)	Retired members	69.8
(e)	Spouses and children receiving benefits	72.7

Active members eligible for vested benefits as of January 1, 2018:

(a)	Members under age 55 with 5 or more years of service – eligible for deferred vested benefits	462
(b)	Members age 55 and over with 5 or more years of service – eligible for early or normal retirement benefits	263
(c)	Members eligible for refund of contributions only	164
(d)	Total	889

MEMBERSHIP DATA FOR VALUATION
(Hired on or after March 1, 2015)

The summary of member characteristics presented below covers the membership as of January 1, 2018. The schedules at the end of the report show the distribution of the various member groups by present age, along with other pertinent data.

Total number of members in valuation:

(a)	Active members	333
(b)	Deferred vested members	0
(c)	Terminated members due a refund	32
(d)	Disabled members	0
(e)	Retired members, spouses and children receiving benefits	0
(f)	Total members in valuation	365

Average age of members in valuation:

(a)	Active members	
	Attained Age	38.9
	Hire Age	37.6
(b)	Deferred vested members	N/A
(c)	Disabled members	N/A
(d)	Retired members	N/A
(e)	Spouses and children receiving benefits	N/A

Active members eligible for vested benefits as of January 1, 2018:

(a)	Members under age 55 with 10 or more years of service – eligible for deferred vested benefits	0
(b)	Members age 55 and over with 10 or more years of service – eligible for early or normal retirement benefits	0
(c)	Members eligible for refund of contributions only	333
(d)	Total	333

MEMBERSHIP DATA RECONCILIATION

January 1, 2017 to January 1, 2018

The number of members included in the valuation, as summarized in the table below, is in accordance with the data submitted by the System for eligible employees as of the valuation date.

	Active Members	Termination Refund Due	Deferred Vested	Disabled	Retirees	Beneficiaries	Total
Total Members as of 1/1/2017	1,197	36	76	109	1,059	262	2,739
New Members	150	11	0	0	0	0	161
Terminations							
Rehired	0	0	0	0	0	0	0
Refunded: Paid	(25)	(9)	(4)	0	0	0	(38)
Refunded: Due	(14)	14	0	0	0	0	0
Deferred Vested	(13)	0	13	0	0	0	0
LTD	0	0	0	0	0	0	0
Retirements	(71)	0	(4)	0	75	0	0
Benefits Expired	0	0	0	0	0	(1)	(1)
Data Corrections	0	0	0	0	0	(2)	(2)
Deaths							
With Beneficiary	(1)	0	0	(3)	(13)	18	1
Without Beneficiary	(1)	0	0	(5)	(20)	(14)	(40)
Total Members as of 1/1/2018	1,222	52	81	101	1,101	263	2,820

SCHEDULE I

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Total)

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	13	5	18	$ 330,024	$ 136,636	$ 466,660
25-29	70	35	105	2,792,051	1,482,382	4,274,433
30-34	81	62	143	3,776,858	2,961,190	6,738,048
35-39	109	48	157	5,762,791	2,629,833	8,392,624
40-44	80	41	121	4,667,094	2,360,737	7,027,831
45-49	133	38	171	8,107,720	1,935,153	10,042,873
50-54	134	48	182	8,067,494	2,774,586	10,842,080
55-59	118	53	171	6,871,557	2,871,415	9,742,972
60-64	68	45	113	4,223,719	2,635,032	6,858,751
Over 64	28	13	41	1,823,759	655,687	2,479,446
Total	834	388	1,222	$46,423,067	$20,442,651	$66,865,718
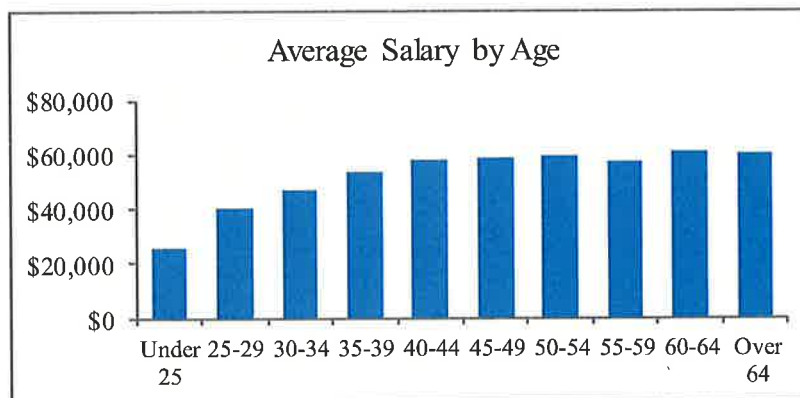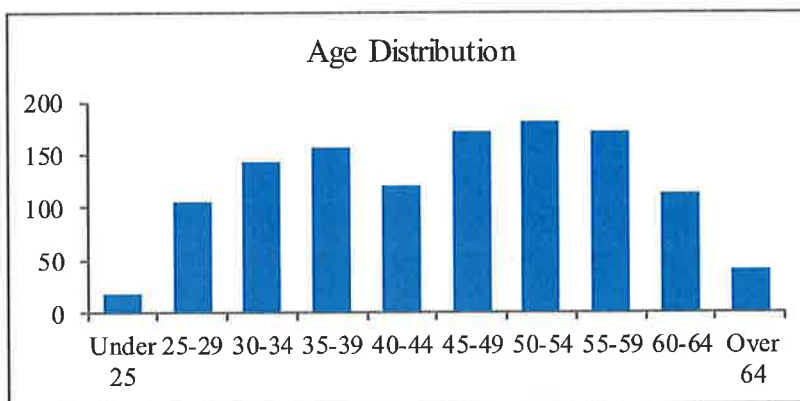
Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Total)

Age	Under 5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Over 40	Total
Under 25	18	0	0	0	0	0	0	0	0	18
25-29	91	14	0	0	0	0	0	0	0	105
30-34	94	43	6	0	0	0	0	0	0	143
35-39	86	40	28	3	0	0	0	0	0	157
40-44	44	40	25	12	0	0	0	0	0	121
45-49	50	45	27	31	15	3	0	0	0	171
50-54	51	25	40	27	24	15	0	0	0	182
55-59	35	33	41	25	16	15	5	1	0	171
60-64	21	26	19	15	21	8	3	0	0	113
Over 64	6	10	9	4	6	3	2	1	0	41
Total	496	276	195	117	82	44	10	2	0	1,222
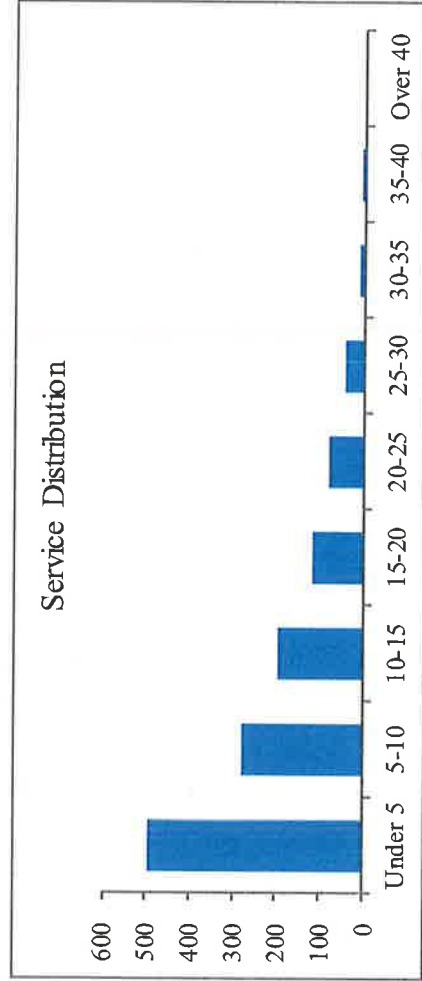
Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Hired before March 1, 2015)

Age	Count of Members			Valuation Salaries of Members		
	Males	Females	Total	Males	Females	Total
Under 25	2	0	2	$ 88,779	$ 0	$ 88,779
25-29	29	12	41	1,406,953	616,417	2,023,370
30-34	48	33	81	2,599,295	1,930,435	4,529,730
35-39	65	32	97	4,104,002	1,957,331	6,061,333
40-44	69	30	99	4,155,293	1,868,471	6,023,764
45-49	108	30	138	7,040,374	1,566,105	8,606,479
50-54	106	35	141	6,788,327	2,203,935	8,992,262
55-59	104	45	149	6,459,166	2,568,260	9,027,426
60-64	62	41	103	4,057,082	2,497,173	6,554,255
Over 64	26	12	38	1,732,396	605,900	2,338,296
Total	619	270	889	$38,431,667	$15,814,027	$54,245,694

Age Distribution

Average Salary by Age
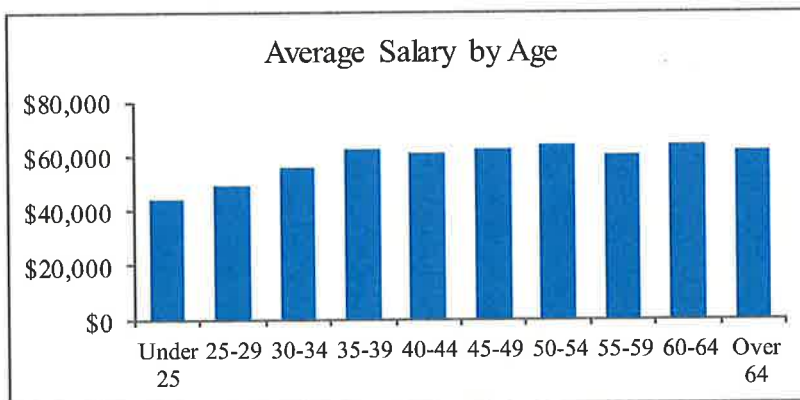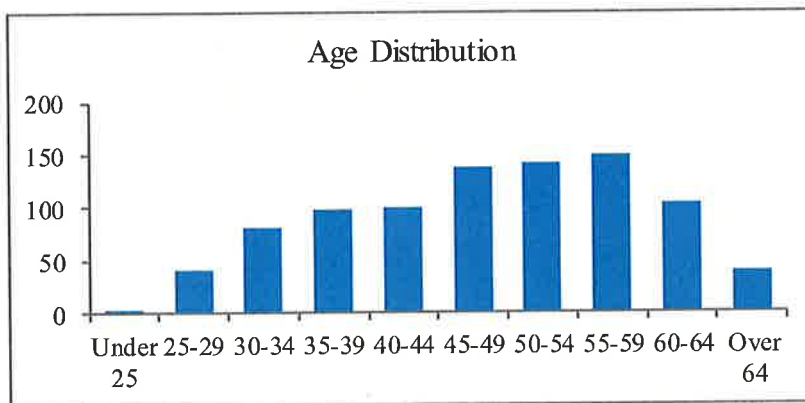
SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Hired before March 1, 2015)

Age					Service					
	Under 5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Over 40	Total
Under 25	2	0	0	0	0	0	0	0	0	2
25-29	27	14	0	0	0	0	0	0	0	41
30-34	32	43	6	0	0	0	0	0	0	81
35-39	26	40	28	3	0	0	0	0	0	97
40-44	22	40	25	12	0	0	0	0	0	99
45-49	17	45	27	31	15	3	0	0	0	138
50-54	10	25	40	27	24	15	0	0	0	141
55-59	14	32	41	25	16	15	5	1	0	149
60-64	11	26	19	15	21	8	3	0	0	103
Over 64	3	10	9	4	6	3	2	1	0	38
Total	164	275	195	117	82	44	10	2	0	889

Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Hired on or after March 1, 2015)

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	11	5	16	$ 241,245	$ 136,636	$ 377,881
25-29	41	23	64	1,385,098	865,965	2,251,063
30-34	33	29	62	1,177,563	1,030,755	2,208,318
35-39	44	16	60	1,658,789	672,502	2,331,291
40-44	11	11	22	511,801	492,266	1,004,067
45-49	25	8	33	1,067,346	369,048	1,436,394
50-54	28	13	41	1,279,167	570,651	1,849,818
55-59	14	8	22	412,391	303,155	715,546
60-64	6	4	10	166,637	137,859	304,496
Over 64	2	1	3	91,363	49,787	141,150
Total	215	118	333	$7,991,400	$4,628,624	$12,620,024
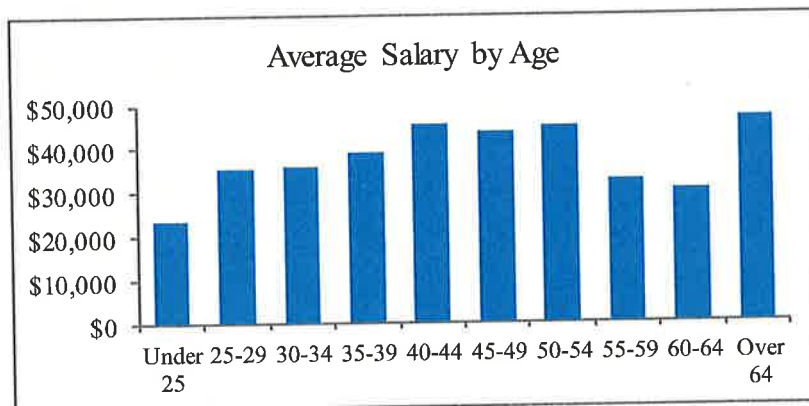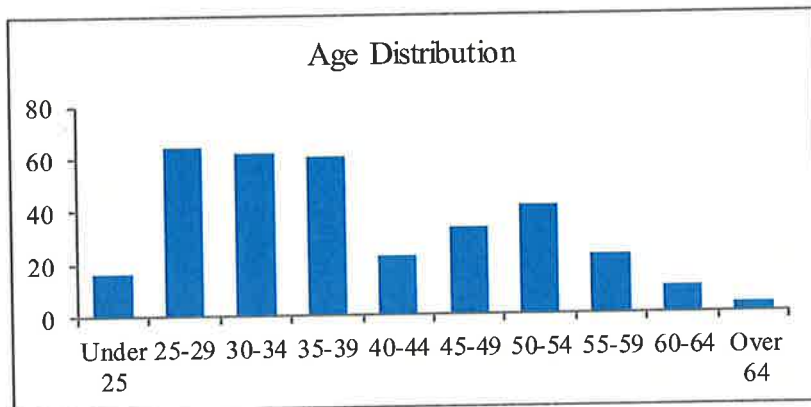
Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
(Hired on or after March 1, 2015)

Age	Under 5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Over 40	Total
Under 25	16	0	0	0	0	0	0	0	0	16
25-29	64	0	0	0	0	0	0	0	0	64
30-34	62	0	0	0	0	0	0	0	0	62
35-39	60	0	0	0	0	0	0	0	0	60
40-44	22	0	0	0	0	0	0	0	0	22
45-49	33	0	0	0	0	0	0	0	0	33
50-54	41	0	0	0	0	0	0	0	0	41
55-59	21	1	0	0	0	0	0	0	0	22
60-64	10	0	0	0	0	0	0	0	0	10
Over 64	3	0	0	0	0	0	0	0	0	3
Total	332	1	0	0	0	0	0	0	0	333

Service

Service Distribution
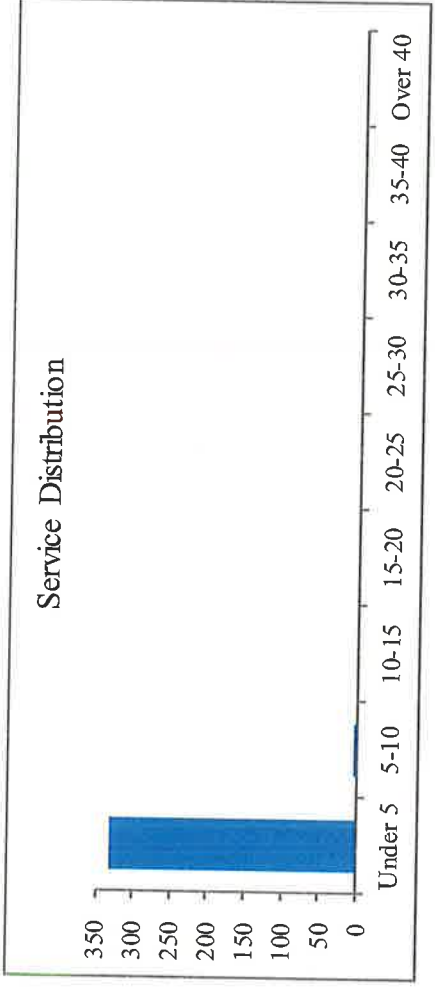
SCHEDULE II

RETIRED MEMBERS AS OF JANUARY 1, 2018

	Count of Retirees				Current Monthly Benefits		
Age	Males	Females	Total		Males	Females	Total
Under 60	53	30	83	$ 171,884	$87,043	$ 258,927
60-64	121	77	198	313,112	168,564	481,676
65-69	214	102	316	519,157	228,293	747,450
70-74	164	77	241	412,630	141,706	554,336
75-79	88	35	123	161,263	50,890	212,153
80-84	52	21	73	93,920	32,762	126,682
85-89	30	15	45	51,767	15,018	66,785
Over 89	13	9	22	23,501	9,302	32,803
Total	735	366	1,101	$1,747,234	$733,578	$2,480,812

Age Distribution

Average Benefit by Age
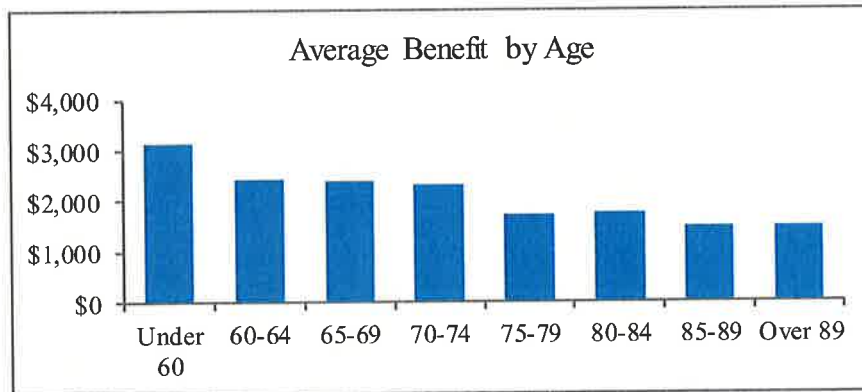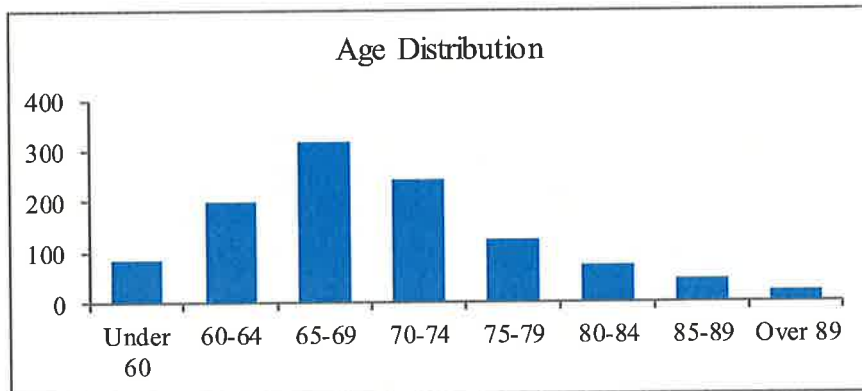
SCHEDULE III

BENEFICIARIES RECEIVING BENEFITS AS OF JANUARY 1, 2018

	Count of Beneficiaries			Current Monthly Benefits		
Age	Males	Females	Total	Males	Females	Total
Under 60	5	25	30	$ 1,912	$ 20,222	$ 22,134
60-64	2	20	22	2,417	26,243	28,660
65-69	7	29	36	5,740	41,170	46,910
70-74	4	36	40	3,680	53,667	57,347
75-79	2	41	43	3,179	59,360	62,539
80-84	2	40	42	2,807	49,428	52,235
85-89	1	28	29	348	40,007	40,355
Over 89	1	20	21	1,477	16,050	17,527
Total	24	239	263	$21,560	$306,147	$327,707

Age Distribution

Average Benefit by Age
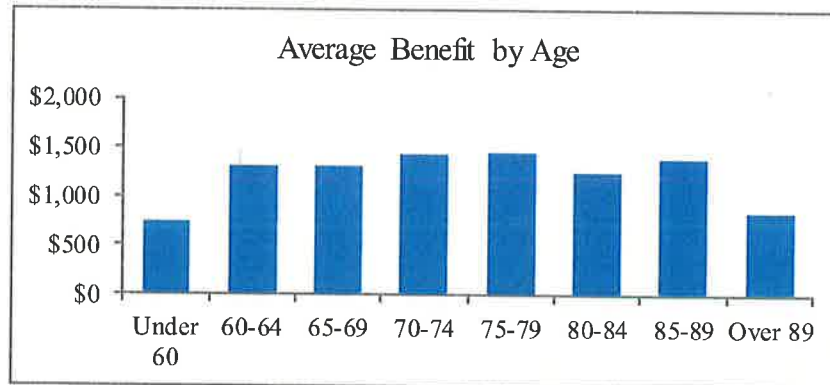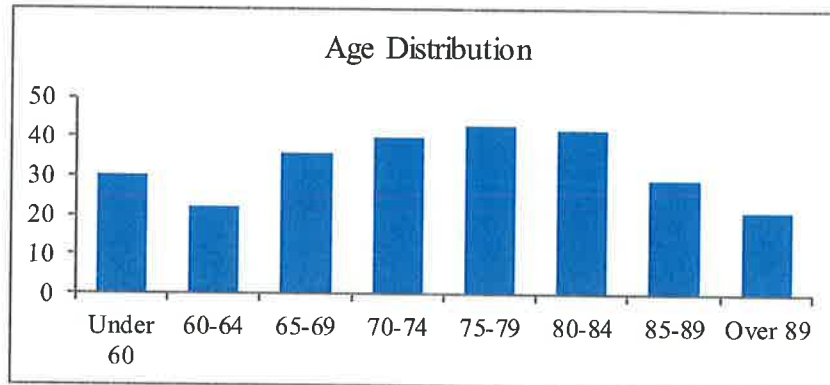
SCHEDULE IV
DEFERRED VESTED MEMBERS AS OF JANUARY 1, 2018

	Count of Members			Expected Monthly Benefit		
Age	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25-29	0	0	0	0	0	0
30-34	3	3	6	2,582	1,599	4,181
35-39	2	3	5	1,462	1,934	3,396
40-44	7	5	12	10,142	4,662	14,804
45-49	9	8	17	8,759	7,942	16,701
50-54	13	7	20	17,867	7,249	25,116
55-59	9	10	19	9,252	13,829	23,081
Over 59	2	0	2	2,890	0	2,890
Total	45	36	81	$52,954	$37,215	$90,169

SCHEDULE V

DISABLED MEMBERS RECEIVING BENEFITS AS OF JANUARY 1, 2018

Age	Count of Members			Current Monthly Benefit		
	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	1	1	2	2,205	2,052	4,257
45-49	3	0	3	5,303	0	5,303
50-54	8	0	8	13,757	0	13,757
55-59	20	2	22	38,736	3,358	42,094
Over 59	52	14	66	75,570	19,580	95,150
Total	84	17	101	$135,571	$24,990	$160,561

Cavanaugh Macdonald
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CITY OF OMAHA POLICE AND FIRE RETIREMENT SYSTEM

Four Year Experience Study
For Period Ending December 31, 2015

Submitted: March 15, 2018

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The experience and dedication you deserve

CITY OF OMAHA EMPLOYEES RETIREMENT SYSTEM

Four Year Experience Study
For Period Ending December 31, 2015

Submitted: February, 2018

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Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

February 7, 2018

Board of Trustees
City of Omaha Employees' Retirement System
1819 Farnam Street
Omaha, NE 68183

Dear Trustees:

It is a pleasure to submit this report of our investigation of the experience of the City of Omaha Employees' Retirement System (System) for the period of January 1, 2012 through December 31, 2015.

The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions to be used in the completion of the upcoming valuation. In some cases, we recommend changes from the prior assumptions that are designed to better anticipate the emerging experience of the Plan. Actual future experience, however, may differ from these assumptions.

In preparing this report, we relied without audit on information supplied by the City for the annual actuarial valuations. If any data or other information is inaccurate or incomplete, our analysis and recommendation may be impacted and a revised report may need to be issued.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* and No. 35, *Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations*.

We look forward to our discussions and the opportunity to respond to your questions and comments.

I, Patrice A. Beckham, am a member of the American Academy of Actuaries, an Enrolled Actuary and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal & Consulting Actuary

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. Actuarial valuations of the City of Omaha Employees' Retirement System (COERS or the System) are prepared annually to determine the actuarial contribution rate to fund the System on an actuarial reserve basis, i.e. the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the System. This rate is then compared to the scheduled contribution rates to evaluate their sufficiency. The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, disability, termination of employment, retirement age and salary changes to estimate the obligations of the System.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have accurately anticipated actual emerging experience. This information, along with the professional judgment of the Board, its advisors, and the actuary, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to realize that actual experience is reported short term while assumptions are intended to be long term estimates of experience. Therefore, no single experience study period should be given full credibility in setting actuarial assumptions. If significant differences exist between what is expected from our assumptions and actual experience, our strategy is usually to recommend a change in assumptions that would produce results somewhere between the actual and expected experience.

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process. From one actuary to another, there should be very little difference in numerical results. However, the setting of assumptions is a different story, as it is more art than science. In this report, we have recommended a few changes to certain assumptions. To allow a better understanding of our thought process, we offer a brief summary of our philosophy:

- **Don't Overreact**: When we see significant differences in actual versus expected experience, we generally do not adjust our rates to reflect the entire difference. If the experience is credible and we believe it reflects future expectations, we will typically recommend rates somewhere between the old rates and the new experience. If the experience during the next study period shows the same result, we will probably recognize the trend at that point in time or at least move further in the direction of the observed experience. On the other hand, if actual experience in the next study is closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.

- **Anticipate Trends**: If there is an identified trend that is expected to continue, we believe that this should be recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.

- **Simplify**: In general, we attempt to identify which factors are significant and eliminate or ignore the ones that do not materially improve the accuracy of the liability projections.

1

SECTION 1 – INTRODUCTION

At the request of the Board of Trustees, Cavanaugh Macdonald Consulting, LLC performed a study of the experience of the City of Omaha Employees Retirement System for the period January 1, 2012 through December 31, 2015. This report presents the results and recommendations of our study which, if approved, will be implemented in the January 1, 2018 actuarial valuation of the System.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

SCOPE OF THIS REPORT

The actuarial valuation utilizes various actuarial methods and two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its impact on the System. Demographic assumptions are based on the emergence of the specific experience of the Systems' members.

All of the major actuarial assumptions that will be used in the January 1, 2018 Actuarial Valuation have been reviewed in this Study. The remainder of this report is divided as follows:

SECTION 2   **EXECUTIVE SUMMARY**
SECTION 3   **ACTUARIAL METHODS**
SECTION 4   **ECONOMIC ASSUMPTIONS**
SECTION 5   **DEMOGRAPHIC ASSUMPTIONS**
SECTION 6   **MORTALITY**
SECTION 7   **RETIREMENT**
SECTION 8   **DISABILITY**
SECTION 9   **TERMINATION OF EMPLOYMENT**
SECTION 10   **SALARY INCREASES**

A brief summary of the results of our findings and recommendations is shown below:

Actuarial Methods

We are <u>not</u> recommending any changes to the current actuarial methods which as shown in the following table:

- Actuarial cost method: Entry age normal
- Asset valuation method: 75% Expected Value + 25% Market Value
- Amortization of unfunded
  actuarial liability: Legacy base at 1/1/16 is amortized over closed 25-years. New bases due to actuarial experience are each amortized over a closed 20-year period. All payments are calculated as a level percent of payroll.

Economic Assumptions

Based on our findings in the experience study, the following set of economic assumptions is recommended:

- Investment Return: 7.50% (Decrease from 8.00%)
- Inflation Assumption: 2.50% (Decrease from 3.25%)
- General Wage Increase: 3.10% (Decrease from 4.00%)
- Payroll Increase: 3.00% (Decrease from 4.00%)
- Interest Crediting Rate*: 6.00% (Decrease from 6.25%)

  *Cash balance members only

Demographic Assumptions

We are also recommending a few changes to the current set of demographic assumptions:

- Minor reduction in early retirement rates.

- Modify the retirement rates at first eligibility date (select period) to better reflect the actual retirement experience observed during the current study period.

- Modify the current unisex termination of employment assumption to a male and female specific assumption.

- Modify and simplify the assumption regarding vested members leaving their contributions in the System to a general 50% assumption at all ages.

- Update the mortality assumption to the RP-2014 Mortality Table (2006 base table) with no age adjustment for males and a one-year age setback for females. Future mortality improvements from 2006 are anticipated with the Mortality Improvement Scale used by the Nebraska Public Employees Retirement System (NPERS).

Financial Impact

The estimated financial impact of the proposed change, based on the results of the January 1, 2017 actuarial valuation, is summarized on the following page. The actual impact will be measured in the January 1, 2018 actuarial valuation. While the magnitude, as a percentage of actuarial liability and normal cost, is expected to be similar, the dollar amount impact will vary from that shown on the following page.

Given the System's funding mechanism and multiple benefit tiers, the snapshot on the valuation date is not always the best indicator of the System's long term funding. We have prepared a projection model, based on the January 1, 2017 valuation including the set of assumptions used in preparing that report. The model indicates that, if all actuarial assumptions are met in future years (including 8% return on assets), the System is expected to be fully funded in 2041. To quantify the impact of the recommended assumptions, including an expected return on assets of 7.50%, the model was updated to reflect the recommended set of assumptions in this experience study. The projected full funding date under that scenario is 2054, an extension of thirteen years. If the estimated return of 13% for calendar year 2017 is reflected in the projection of funded status using the recommended assumption, the full funding date moves to 2049.

Estimate of Financial Impact of Assumption Changes
Based on Preliminary January 1, 2017 Valuation Results

	Baseline	Economic Assumptions*	All New Assumptions*
1. Present Value of Future Benefits	$493,356,506	$510,531,511	$522,217,297
2. Present Value Future Normal Costs	49,584,885	49,081,146	51,269,462
3. Actuarial Liability (1) – (2)	443,771,621	461,450,365	470,947,835
4. Actuarial Value of Assets	246,234,597	246,234,597	246,234,597
5. Unfunded Actuarial Liability (UAL) (3) – (4)	$197,537,024	$215,215,768	$224,713,238
6. Normal Cost Rate	9.721%	9.912%	10.066%
7. UAL Payment	18.019%	20.693%	21.586%
8. Actuarial Contribution Rate	27.740%	30.605%	31.652%
9. Scheduled Contribution Rates	(28.850%)	(28.850%)	(28.850%)
10. Contribution Shortfall/(Margin)	(1.110%)	1.755%	2.802%

* The increase in the UAL due to the assumption changes is amortized over a new 25-year period.

ACTUARIAL COST METHOD

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed; i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries **will** influence the incidence of costs by their choice of methods and assumptions.

The valuation or determination of the present value of all future benefits to be paid by the System reflects the assumptions that best seem to describe anticipated future experience. The choice of a funding method does not impact the determination of the present value of future benefits. The funding method, determines only the incidence of cost. In other words, the purpose of the funding method is to allocate the present value of future benefits determination into annual costs. In order to perform this allocation, it is necessary for the funding method to "break down" the present value of future benefits into two components: (1) that which is attributable to the past (2) and that which is attributable to the future. The excess of that portion attributable to the past over the plan assets is then amortized over a period of years. Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial liability". The portion of the present value of future benefits allocated to the future is commonly known as "the present value of future normal costs", with the specific piece of it allocated to the current year being called "the normal cost". The difference between the plan assets and actuarial liability is called the "unfunded actuarial liability".

Two key points should be noted. First, there is no single "correct" funding method. Second, the allocation of the present value of future benefits and hence cost to the past for amortization of the UAL and to the future for annual normal cost payments is not reflective of the actual service credits earned in the past and future service credits to be earned.

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. Currently, the Entry-Age Normal method is used in the annual actuarial valuation. The rationale of the entry age normal (EAN) funding method is that the cost of each member's benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit which is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The entry age normal actuarial liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial liability, the value of plan assets is subtracted from the entry age normal actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as predicted by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

The Entry Age Normal cost method is the most commonly used cost method by public plans because it develops a normal cost rate that tends to be stable and less volatile. It also is the required cost method under calculations required by the Governmental Accounting Standards, Number 67 and 68, which are used for financial reporting. **We recommend the Entry Age Normal actuarial cost method be retained.**

ACTUARIAL VALUE OF ASSETS

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value (called the actuarial value of assets) is often used to smooth out the volatility in the market value. This is because most plan sponsors would rather have annual costs remain relatively level, as a percentage of payroll or in actual dollars, rather than a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. The American Academy of Actuaries (AAA) has basic principles regarding the calculation of a smoothed asset value, *Actuarial Standard of Practice No. 44 (ASOP 44), Selection and Use of Asset Valuation Methods for Pension Valuations.*

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to distort annual funding patterns. No matter which asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

COERS values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. This philosophy is consistent with the long-term nature of a retirement system. Under this method, the actuarial value of the assets is the expected value of assets plus 25% of the difference between market value and expected value, where the expected value is last year's actuarial value and subsequent cash flows into and out of the fund accumulated with interest at the valuation rate (currently 8%). This is mathematically equivalent to using a weighted average of 75% of the expected value and 25% of actual market value.

The current asset valuation method for COERS also includes what is known as a "corridor", which provides that once the initial determination of the actuarial value of assets is made it is compared to a corridor around

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market value (80% of market value to 120% of market value). If the initial actuarial value lies outside the corridor, the final actuarial value of assets is set equal to the corresponding corridor value. For example, if the initial calculation of the actuarial value of assets is 132% of market value, the actuarial value is set equal to 120% of market value. We believe the corridor is necessary to ensure actuarial standards are met.

An asset valuation method is used to "smooth out" the volatility that occurs in the market value of assets. We believe the current method is reasonable and provides adequate smoothing while the corridor ensures the asset valuation method meets actuarial standards. **We recommend the current asset valuation method be retained.**

AMORTIZATION OF UAL

As described above, actuarial liabilities are the portion of the actuarial present value of future benefits that are not included in future normal costs. Thus it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded actuarial liabilities (UAL) exist when actuarial liabilities exceed plan assets. These deficiencies can result from (i) benefit improvements that have not been completely paid for, (ii) experience that is less favorable than expected, (iii) assumption changes that increase liabilities, or (iv) contributions that are less than the actuarial contribution rate.

There are a variety of different methods that can be used to amortize the UAL. Each method results in a different payment stream and, therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization amount increases, and
- The number of components of UAL with separate amortization bases.

Amortization Period: The amortization period can be either "closed" or "open". If it is a closed amortization period, the number of year remaining in the amortization period decreases by one each year. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but is remains the same number each year. This approach essentially "refinances" the System's debt (UAL) every year, pushing off the payment of the UAL to future years. While the funded ratio may increase over time under the open amortization period, the System is not expected to reach a funded ratio of 100%. The open amortization policy is especially of concern when the amortization period is very long (i.e. 25 or 30 years) due to the negative amortization that occurs with the level percent of pay financing method (UAL payment is less than the interest on the UAL so the dollar amount of the UAL continually increases).

Amortization Payment Method:
Level Dollar: The level dollar amortization policy is similar to the method in which a home owner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on a predetermined number of years, until the liability is extinguished. This results in the dollar amount of the liability steadily decreasing while the payments, though remaining level in dollar terms, in all likelihood decrease as a percentage of payroll. (Even if a plan sponsor's population is not growing or even slightly diminishing, inflationary increases will usually be sufficient to increase the aggregate covered payroll).

Level Percent of Payroll: The rationale behind the level percentage of payroll amortization method is that since the Plan is partially funded with employee contributions that are a percentage of payroll and normal costs are calculated to remain a constant percentage of pay, unfunded actuarial liabilities should be paid off

in a similar manner. When this method of amortizing the unfunded actuarial liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method, but the dollar amount of the payments increase at a fixed rate so that ultimately the dollar amount of the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase as rapidly so that the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial liability meaning that even if there are no experience losses, the dollar amount of the unfunded actuarial liability will grow (called negative amortization). This is particularly true if the plan sponsor is paying off the unfunded actuarial liability over a relatively long period, such as 25 or 30 years.

The following graph shows the dollar amount of amortization payment under the different amortization methods, discussed earlier:

Use of the level percentage of payroll amortization has its advantages and disadvantages. From a budgetary standpoint, it makes sense to develop UAL contribution rates that are level as a percentage of payroll since contributions to fund the Plan are made as a percent of payroll and normal cost is developed as a level percent of payroll. However, if payroll doesn't grow as expected, the UAL payment will increase as a percent of payroll rather than remain level. In addition, this approach clearly results in slower funding of the UAL, as illustrated in the following graph:
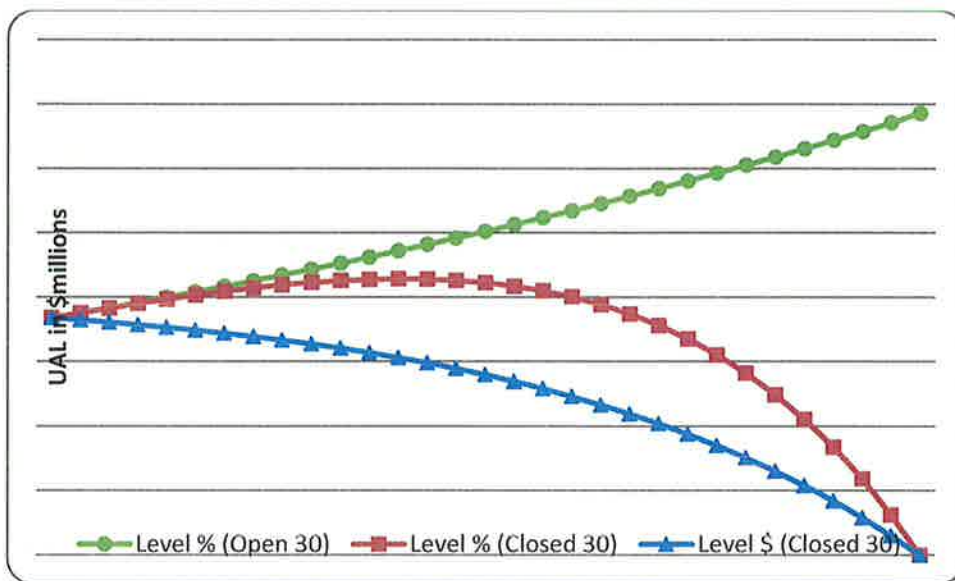
Amortization bases: The UAL can be amortized as one base, with one payment amount, or in component parts or layers. In the last experience study, the layered amortization policy was recommended and adopted. The 2016 UAL base (legacy base) is amortized over a closed 25-year period that began January 1, 2016 (so 24 years remain as of January 1, 2017). New amortization bases are created on each subsequent valuation date equal to the difference between the actual and expected UAL (actuarial gains/losses) with payments amortized over a closed 20-year period, commencing on that valuation date. A new amortization base will also be created when actuarial assumptions are changed or the benefit structure is modified. An appropriate period can be determined by the Board for these events, after discussion with the actuary. **We recommend the current amortization policy be retained and the Board discuss the appropriate amortization period to use for the UAL base created as the result of the assumption changes recommended in this study.**

ECONOMIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* provides guidance to actuaries giving advice on the selection of economic assumptions for measuring obligations under defined benefit plans, such as COERS.

The economic assumptions used in the COERS valuation include price inflation, long-term investment return, wage growth (the across-the-board portion of salary increases) and increase in the covered payroll assumption. Unlike demographic assumptions, economic assumptions do not lend themselves to analysis largely on the basis of internal historical patterns because economic assumptions are impacted by external forces in the economy. The investment return and general wage increase assumptions are selected on the basis of expectations in an inflation-free environment and then increased by the long-term expectation for inflation, called the "building block" approach.

Sources of data considered in the analysis and selection of the economic assumptions included:
- The 2017 Social Security Trustees Report
- Future expectations of COERS' investment consultant, DeMarche & Associates
- Future expectations of other investment consultants (2016 Horizon Actuarial Services Survey)
- U.S. Department of the Treasury bond rates
- Assumptions used by other large public retirement systems, based on the Public Fund Survey, published by the National Association of State Retirement Administrators (NASRA)
- Historical observations of price and wage growth statistics and investment returns.

Actuarial Standard of Practice Number 27

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment.

ASOP 27 requires the actuary to select a "reasonable" assumption. For this purpose, an assumption is reasonable if it has the following characteristics:

    a. it is appropriate for the purpose of the measurement;
    b. it reflects the actuary's professional judgment;
    c. it takes into account historical and current economic data that is relevant as of the measurement date;
    d. it reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
    e. it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic) except when provisions for adverse deviation or plan provisions that are difficult to measure are included.

With respect to relevant data, the standard recommends the actuary review appropriate recent and long-term historical economic data, but advises the actuary not to give undue weight to recent experience. Furthermore, it advises the actuary to consider that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment. In addition, with respect to any particular valuation, each economic assumption should be consistent with all other economic assumptions over the measurement period.

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ASOP 27 recognizes that economic data and analyses are available from a variety of sources, including representatives of the plan sponsor, investment advisors, economists, and other professionals. The actuary is permitted to incorporate the views of experts, but the selection or advice must reflect the actuary's professional judgment.

The standard also discusses a "range of reasonable assumptions" which in part states "the actuary should also recognize that different actuaries will apply professional judgment and may choose different reasonable assumptions." As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

The remaining section of this report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of the COERS. In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table summarizes the economic assumptions:

	Current Assumptions	Recommended Assumptions
A. Price Inflation	3.25%	2.50%
B. Investment Return	8.00%	7.50%
C. Interest Crediting Rate (Cash Balance Plan only)	6.25%	6.00%
D. General Wage Growth	4.00%	3.10%
E. Covered Payroll Increase	4.00%	3.00%

Price Inflation

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage growth (which then impacts individual salary increases), and payroll growth.

The long-term relationship between price inflation and investment return, recognized by economists, is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while lower inflation rates are expected to result in lower expected investment returns, at least in the long run.

The current assumption for price inflation is 3.25% per year which was recommended and adopted in the last experience study.

Past Experience: Although economic activities, in general, and inflation in particular, do not lend themselves to prediction solely on the basis of historical analysis, historical patterns and long-term trends

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are factors to be considered in developing the inflation assumption. The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The following table provides historical annualized rates and annual standard deviations of the CPI-U over periods ending December 31st.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2016	90	2.94%	3.83%
1956 – 2016	60	3.70	2.75
1966 – 2016	50	4.09	2.82
1976 – 2016	40	3.66	2.77
1986 – 2016	30	2.65	1.22
1996 – 2016	20	2.15	1.04
2006 - 2016	10	1.76	1.29

The following graph illustrates the historical annual change in price inflation, measured as of December 31 for each of the last 70 years, as well as the thirty year rolling average.

Over more recent periods, measured from December 31, 2016, the average annual rate of increase in the CPI-U has been well below the current assumption of 3.25%. While it is true that the period of high inflation from 1973 to 1982 has a significant impact on the averages over periods which include these rates, the decline in inflation shown in the data above is clear.

Forecasts of Inflation

Additional information to consider in formulating this assumption is obtained from measuring the spread on Treasury Inflation Protected Securities (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities (bonds) and the inflation indexed yield on TIPS of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. Current market prices, as of December 2016, suggest that the bond market expects inflation to be around 2.1% over the next 30 years. The bond market expectations may be heavily influenced by the low interest rate environment created by the Federal Reserve Bank's manipulation of the bond market. Whether inflation returns to the higher rates observed historically remains to be seen.

COERS' investment consultant, DeMarche, also has an inflation forecast in their capital market assumptions. Their short-term assumption is 2.0% and their longer-term assumption is 2.7%. It can also be insightful to compare the inflation assumptions of other investment consultants. Horizon Actuarial Services prepares an annual study in which they survey various investment advisors and provide ranges of results as well as medians. The 2017 Horizon Survey included a total of 35 investment advisors who provided their capital market assumptions of which 12 provided both short-term and long-term assumptions. The range of inflation assumptions for the firms providing long-term assumptions was 2.2% to 2.8% with a median inflation assumption of 2.5%.

Social Security Projections

Although many economists forecast lower inflation than the assumptions used by retirement systems, they are generally looking at a shorter time horizon (5-10 years) than may be appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the most recent report (July 2017), the projected average annual increase in the CPI over the next 75 years was estimated to be 2.6%, under the intermediate (best estimate) cost assumption. The range of price inflation used in the Social Security 75-year modeling, which includes a low and high cost scenario, in addition to the intermediate cost projection, was 2.0% to 3.2%.

Other Forecasts

Another source to consider in setting this assumption is a quarterly survey of the Society of Professional Forecasters (economists) that is conducted by the Philadelphia Federal Reserve. Their most recent forecast (third quarter of 2017) was for inflation over the next ten years (2017 to 2026) to average 2.25%.

Peer System Comparison

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. Based on the Public Plan Database (a survey of over 125+ state and local retirement systems maintained by a collaboration between the Center for Retirement Research at Boston College, the Center for State and Local Government Excellence, and the National Association of State Retirement Administrators), the average inflation assumption for governmental plans has been steadily declining. Based on the current data, both the average and median inflation assumption is 3.00%. However, the survey is based on valuations that are from 2014 or 2015. Based on our experience, we believe that further declines in the inflation assumption have occurred for many systems over the last two years.

Comparison of Inflation Expectations

The following table provides a comparison of the current levels of expected inflation.

Source	Expected Inflation
COERS Consultant (DeMarche)	2.50%*
Horizon Survey	2.50%
Bond Market	2.10%
2017 Social Security Report	2.60%
Survey of Professional Forecasters	2.25%

*Blended rate of 2.0% for ten years and 2.70% for twenty years.

Conclusion: While actuarial standards caution against too much consideration of recent events, the lower inflation over the last 10, 20 and even 30 years, coupled with the low future inflation anticipated by the bond markets, investment consultants, and professional economic forecasters suggests that there may have been a fundamental change away from the longer term historical norms. Based on the information presented above, **we recommend a reduction in the inflation assumption from 3.25% to 2.50%.**

Consumer Price Inflation	
Current Assumption	3.25%
Recommended Assumption	2.50%

INVESTMENT RETURN

Use In The Valuation: The investment return assumption is one of the primary determinants in the allocation of the expected cost of the System's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. Generally, the investment return assumption should represent the long-term rate of return on the plan assets, considering the asset allocation policy, expected long term real rates of return on the specific asset classes, the underlying inflation rate, and investment expenses.

The current investment return assumption is 8.0% per year, net of all investment-related expenses (administrative expenses are paid directly by the City). The 8.0% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is price inflation (previously discussed). Any excess return over price inflation is referred to as the real rate of return. The real rate of return, based on the current set of assumptions, is 4.75% (8.00% nominal return less 3.25% inflation).

Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon so as to make prudent choices regarding how to invest the trust funds, i.e., asset allocation. For actuarial calculations, we typically consider very long periods of time as some current employees will be receiving benefit payments

more than 80 years from now. For example, a newly-hired employee who is 30 years old may work for 35 years, to age 65, retire and live another 30 years, to age 95. The retirement system would receive contributions for the first 35 years and then pay out benefits for the next 30 years. During the entire 65-year period, the system is investing assets on behalf of the member's liability. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open plan like COERS, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in time horizon between investment consultants and actuaries is frequently a source of debate and confusion when setting economic assumptions.

The Actuarial Standards Board Statement Number 27 (ASOP 27) provides guidance to actuaries on the selection of economic assumptions used for measuring pension obligations. The current edition of ASOP 27 calls for the actuary to select a "reasonable" assumption. It goes on to say an assumption is "reasonable" if it has no significant bias (i.e. it is neither significantly optimistic nor pessimistic). The standard also describes a "Range of Reasonable Assumptions". In part, this definition states, "the actuary should also recognize that different actuaries will apply different professional judgment and may choose different, reasonable assumptions". As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

In general, we have observed a reduction in the capital market assumptions by both actuarial firms and investment consultants over the last decade. The impact of this trend on public pension funds is evident by observing the data in the Public Fund Survey (published by the National Association of State Retirement Administrators). The median investment return assumption, which was 8.0% for many years, is now 7.50% and discussions are still occurring in many systems about reductions to the current investment return assumption.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used if the year-to-year results vary widely. Even though history provides a valuable perspective for setting this assumption, the economy of the past is not necessarily the economy of the future. In addition, asset allocations may have changed over the period so returns may not be directly comparable.

The System's actual investment return on the market value of assets is shown in the graph below:

Historical Investment Returns
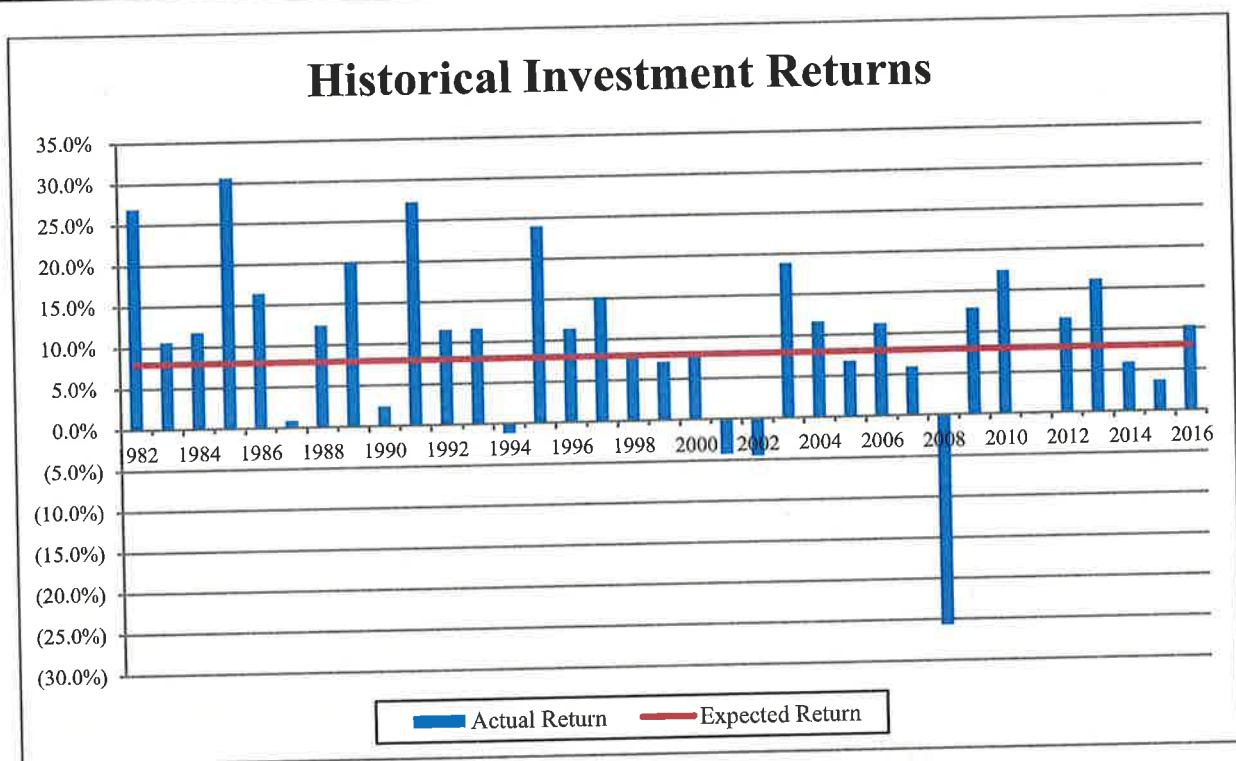
The compound return has varied significantly when viewed over different time periods. For example, the rate of return over the ten-year period ending December 31, 2016 was 5.1%, the rate of return over the twenty-year period ending December 31, 2016 was 6.3% and the rate of return over the thirty-year period ending December 31, 2016 was 8.1%.

Forward Looking Analysis

We believe the most appropriate analysis to consider in setting the investment return assumption is to model the expected returns, given the system's target asset allocation and forward-looking capital market assumptions. However, we are trained as actuaries and not as investment professionals. As such, we rely heavily on professional investment consultants, such as DeMarche, to provide investment expertise including capital market assumptions.

In performing our analysis, we use the building block approach so the real rate of return of the portfolio is modeled, based on the target asset allocation, and then the expected return is added to the price inflation assumption. Therefore, our analysis focuses on the real rate of return while the analysis of the investment consultants more typically focuses on the nominal return in their asset allocation consulting. COERS' current target asset allocation, along with their investment consultant's (DeMarche) secular (long-term) capital market assumptions, are shown in the following table:

Asset Category	Asset Allocation	Expected Real Rate of Return (Arithmetic)	Standard Deviation
Large Cap Equity	10.0%	6.6%	17.0%
Mid Cap Equity	5.0	7.1	19.5
Small Cap Equity	8.0	8.0	23.0
International Equity	5.0	7.1	20.0
Emerging Markets	10.0	9.1	27.0
Fixed Income - Intermediate	8.5	2.5	6.1
Fixed Income – High Yield	8.5	5.0	10.0
Real Estate	20.0	5.2	7.0
Private Equity	11.5	9.1	13.6
Commodities	3.5	5.8	20.0
Global Hedge Funds	10.0	3.0	6.0
Total	100%		

Using the target asset allocation shown in the table above, we applied a standard mean/variance model to calculate percentile return estimates based on the capital market assumptions. The results in the following table provide an expected range of real returns over a 50-year time horizon using DeMarche's long-term (secular) capital market assumptions.

Time Span In Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	95th
1	6.15%	9.93%	-9.38%	-0.76%	5.70%	12.56%	23.20%
5	5.79	4.42	-1.32	2.76	5.70	8.71	13.20
10	5.74	3.12	0.68	3.61	5.70	7.82	10.95
20	5.72	2.21	2.13	4.22	5.70	7.20	9.39
30	5.71	1.80	2.77	4.49	5.70	6.92	8.70
50	5.71	1.40	3.43	4.76	5.70	6.64	8.02

Looking at one year's results produces an expected return of 5.70% but also has a high standard deviation or measurement of volatility illustrated by the range of results, i.e. 5% of the results will be below -9.38% and 5% will be above 23.20%. By expanding the time horizon, the average (mean) return does not change much, but the volatility declines significantly (range for 50 year time span is 3.43% to 8.02%). Based on this analysis, there is 50% likelihood that the average real rate of return over a 50-year period will be 5.70% or higher. As the time span increases, the range of expected results narrows. Over a 50-year time span, the results indicate there is a 25% chance that returns will be below 4.76% and a 25% chance they will be above 6.64%. In other words, there is a 50% chance the real returns will be between 4.76% and 6.64%.

A similar analysis, using DeMarche's short-term (Moderate) capital market assumptions, produced an expected real return of 4.78%, about a 1% difference. The same perspective is evident in the capital market assumptions used by most investment consultants. As mentioned earlier, the Horizon Actuarial Survey

compiles the data on capital market assumptions from many different investment consultants and provides medians as well as the range of results. Based on the median assumptions in the 2017 Horizon Survey, the expected real rate of return of the COERS' portfolio, using the short-term assumptions, was 4.77% and was 5.62% using the long-term assumptions.

Peer System Comparison

Public retirement systems have historically compared their investment performance to their peer group. While we believe there is some merit in assessing the movement in the assumed rate of return for other systems, this is not an appropriate basis for setting this assumption in our opinion. For example, different plans have different plan dynamics which will impact their choice of the assumed investment return. This peer group information merely provides another set of relevant data to consider, as long as we recognize that asset allocation varies from system to system.

The graph below shows the change in the distribution of the investment return assumption from fiscal year 2001 through February, 2017 for the 120+ large public retirement systems included in the NASRA Public Fund Survey. As it indicates, the investment return assumptions used by public plans have decreased over the last fifteen years, likely heavily impacted by a corresponding decrease in the underlying inflation assumption over the same period. It is worth noting that the median investment return assumption in fiscal year 2012 dropped from 8.00% to 7.75% and has declined further to 7.50% in 2016 and 2017. We believe we will continue to see more systems moving to a lower assumption as future experience studies are completed in the next few years.

Change in distribution of investment return assumptions, FY 01 to present

Public Fund Survey, NASRA Feb-17 Fiscal Year *preliminary

Administrative Expense Assumption

All investment-related expenses are paid from returns on the plan assets and administrative expenses are paid directly by the City. Therefore, no assumption for administrative expenses is necessary in the calculation of the actuarial required contribution.

Summary

It is important to reemphasize that the assumptions used by many investment consultants are intended to assist the Board with determining asset allocations. As a result, they may be more short-term in nature and reflective of the current market conditions than the investment return assumption developed by the actuary for funding the benefits and measuring liabilities. Although this has always been the case, the significant difference that currently exists in expected returns over the short term versus the long term causes more of a challenge in setting the investment return assumption. For example, DeMarche's long-term assumptions produce an expected nominal return of 8.40% compared to their 10-year expected return of 6.78%. If only the real rate of return is considered, the difference is still significant: 5.70% over 30 years compared to 4.78% for the 10-year return, nearly a 1% difference. A similar outlook is evident for the 12 consultants included in the Horizon Survey who provided both short-term (10 years) and long-term (20 years) assumptions (8.06% for long-term expected return and 7.01% for short-term expected return). The consensus of the investment consulting community seems to be that short-term returns will be materially lower than both historic returns and projected returns over the longer term.

Recommendation:

Because investment earnings account for the majority of revenue for most public plans, the choice of an investment return assumption has a major impact on a system's financing and actuarial funded status. An investment return assumption that is too low will overstate liabilities and costs, causing current members/ taxpayers to be overcharged and future members/taxpayers to be undercharged. An investment return assumption that is too high will understate liabilities and undercharge current members/taxpayers at the expense of future members/taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and inequitable distribution of costs among generations of members/ratepayers. Because of this, setting the investment return assumption requires a balancing act with an attempt to not be overly conservative nor aggressive, although some margin for adverse deviation is acceptable.

By actuarial standards, we are required to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe we must be careful not to let recent experience or short-term expectations impact our judgment regarding an appropriate investment return assumption over the long term. However, given the material difference in expectations in the short and long term, along with the fact that benefit payments will exceed contributions (negative cash flow) during this period, it is difficult to ignore the impact of the lower returns in the short term on the funding of the system.

COERS's current real rate of return assumption is 4.75%. DeMarche's 2017 long-term capital market assumptions result in a real return of 5.70% and their short-term capital market assumptions produce a real return of 4.78%. Likewise, the Horizon Survey also indicates a significant difference between the short-term and long-term return expectations. The amount of negative cash flow each year reduces the corpus of the assets that is available to earn the higher returns expected in later years. This negative impact on the accumulation of assets has to be balanced with the expected real return of the portfolio. Taking all of these factors into consideration, we are recommending the real rate of return increase from 4.75% to 5.00%.

However, coupled with the reduction in the inflation assumption of 0.75%, the net impact is a reduction in the investment return assumption. **We recommend the investment return assumption be decreased from 8.0% to 7.5%.**

The components of the nominal return are shown in the table below:

	Current Assumption	Proposed Assumption
Real return	4.75%	5.00%
Price inflation	3.25%	2.50%
Nominal return	8.00%	7.50%

INTEREST CREDITING RATE FOR CASH BALANCE MEMBERS

A cash balance plan covers members hired in covered employment on or after March 1, 2015. The member's benefit is based on his or her account balance composed of pay credits, interest credits, and dividends. The interest credit is based on the guaranteed interest crediting rate of 4%. The dividend is a variable amount, determined annually using the following formula: 75% of the return above 7% calculated on a rolling five-year average compound return using the market value of assets. The current assumption for the total interest crediting rate (guaranteed interest plus dividends) for cash balance members, which reflects the underlying investment return assumption of 8.0%, is 6.25%.

To estimate the long-term effective interest crediting rate based on an investment return assumption of 7.50%, we randomly generated 1,000 50-year periods using the corresponding expected return and the portfolio's standard deviation. For each of these scenarios, the effective compound interest crediting rate was calculated using the formula for the dividend and the guaranteed interest crediting rate. The average total effective interest crediting rate (guaranteed plus dividend) for the 50-year period, rounded to the nearest quarter percentage, was 6.00%. **We recommend that the assumed total interest crediting rate, including dividends, for cash balance members in the valuation be lowered from 6.25% to 6.00%.**

GENERAL WAGE GROWTH

Background: General wage growth, thought of as the "across the board" rate of salary increases, is composed of the price inflation assumption and an assumption for the real rate of wage increases/real wage growth. The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity growth.

In constructing the salary increase assumption used to project future salary increases for individual members, the wage growth assumption is combined with an assumption for service-based salary increases (called a merit scale). The service-based salary increase assumption will be addressed when the demographic assumptions are studied. Given the current price inflation assumption of 3.25%, the current wage growth assumption of 4.0% implies an assumed real rate of wage increase or real wage growth assumption of 0.75%.

Historical Perspective: Wage statistics are found in the Social Security System database on the National Average Wage data. This information goes back to 1955 and is the most comprehensive database available. Because the National Average Wage is based on all wage earners in the country who are covered by Social Security, it can be influenced by the mix of jobs (full-time vs. part-time, manufacturing vs. service, etc.) as well as by changes in some segments of the workforce that are not seen in all segments (e.g. regional changes or growth in computer technology). Furthermore, if compensation is shifted between wages and benefits, the wage index would not accurately reflect increases in total compensation.

COERS' membership is composed exclusively of governmental employees working in Omaha Nebraska, whose wages and benefits are linked as a result of the state and local economy, funding allocations, and governing policies. Because the competition for workers can, in the long term, extend across industries and geography, the broad national earnings growth will have some impact on COERS members. In the shorter term, however, the wage growth of COERS employees and the nation may be less directly correlated.

The excess of wage growth over price inflation represents the real wage growth rate. The following table shows the compounded wage growth over various periods, along with the comparable price inflation rate for the same period. The differences represent the real wage growth rate.

Years	Period	General Wage Inflation	CPI Increase	Real Wage Inflation
2006-2016	10	2.3%	1.8%	0.5%
1996-2016	20	3.2%	2.2%	1.0%
1986-2016	30	3.5%	2.7%	0.8%
1976-2016	40	4.2%	3.7%	0.5%
1966-2016	50	4.7%	4.1%	0.6%
1956-2016	60	4.5%	3.7%	0.8%

Similar information over rolling thirty year periods is shown in the following graph:

Over the last 30 years, the real wage increase, as measured by the increase in the National Average Wage Index, has been 0.87% per year on average. A somewhat similar, but slightly different set of data is available from the Bureau of Labor Statistics, which reports the median weekly wage for full-time employees. Over the last 30 years, this amount (adjusted for inflation) has had an average increase of 0.20% per year. Part of the difference in these results arises from the difference between using an average and a median. There are also technical differences arising from which workers are included in each measure.

System Experience: We reviewed the total covered payroll along with the active member count each year from 2007 through 2017. Since there was an increase over this period, the most meaningful metric to analyze is the change in the average salary. The average salary for active members in 2007 was $44,219 while in the 2017 valuation, the average salary was $59,209. This represents an average annual increase over the ten year period of 3.0%.

Forecasts of Future Wages: The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In the July, 2017 Trustees Report, the annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.8%, 1.2% higher than the Social Security Administration's intermediate inflation assumption of 2.6% per year. The range of the assumed real wage growth in the 2016 Trustees report was 0.5% to 1.8% per year.

Analysis and Conclusion: Over the last 30 years, the actual experience on a national basis has been slightly higher than the current assumption. However, this is based on SSA data which uses the average wages of all US workers. As mentioned earlier, the median real wage increase has been significantly lower. We believe that wages will continue to grow at a greater rate than prices over the long term, although not necessarily at the level projected by Social Security.

Based on the available data and our professional judgment, **we recommend that the long-term assumed real wage growth decrease from 0.75% to 0.60% per year. When coupled with the reduction in the price inflation assumption to 2.50%, the resulting general wage growth assumption decreases from 4.00% to 3.10%.**

PAYROLL GROWTH ASSUMPTION

Amortization payments on the unfunded actuarial liability are currently determined as a level percent of payroll. Therefore, the valuation requires an assumption regarding future annual increases in covered payroll. The wage growth assumption is typically used for this purpose. The current payroll growth assumption is 4.00%, the same as the current wage growth assumption.

Actual covered payroll for COERS increased an average of 3.8% per year over the last ten years, part of that increases reflects a nearly 9% increase in the number of active employees. The average salary, which accounts for the change in the number of active members, increased an average of 3.0% per year over the same period.

Although the number of active members has increased over the last ten years, we propose continuing the current assumption that no future growth or decrease in the number of active members will occur. If increases should occur not only because of wage increases, but also because of additional active members, there will be a larger pool of salaries over which to spread the payment on the unfunded actuarial liability, which would result in lower UAL payments, as a percent of payroll. To build in a small margin of conservatism, **we recommend the payroll growth assumption be set at 3.0%, slightly lower than the general wage increase assumption (3.1%).**

DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 35 provides guidance to actuaries regarding the selection of demographic and other non-economic assumptions for measuring pension obligations.

ASOP 35 General Considerations and Application

Each individual demographic assumption should satisfy the criteria of ASOP 35. In selecting demographic assumptions the actuary should also consider: the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date, the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 35.

Overview of Analysis

The purpose of a study of demographic experience is to compare what actually happened to the individual members of the System during the study period (calendar years 2012 through 2015) with what was expected to happen, based on the actuarial assumptions. A single four-year period is a relatively short observation period, particularly given the size of the group. Therefore, we have considered the results of the prior Experience Study when deemed appropriate. However, professional judgment has a heavy influence on the recommendations in this report.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the study is tabulated by age, duration, gender, group, and membership class (active, retired, etc.).

- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.

- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio), and is expressed as a percentage.

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Judgment is required to anticipate future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

It takes a fair amount of data to provide experience study results that are fully credible for demographic assumptions. Because the membership or certain subsets of the membership are relatively small, some assumptions have been selected based more on our professional judgment of reasonable future outcomes than actual experience.

ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Pursuant to ASOP 35 the actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.

2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.

3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age or service. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.

4. Select the specific assumptions. In selecting an assumption the actuary should consider the potential impact of future plan design as well as the factors listed above.

5. Evaluate the reasonableness of the selected assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

MORTALITY

One of the most important demographic assumptions in the valuation is mortality because it projects the duration of retirement benefit payments. If members live longer than expected, the true cost of future benefit obligations will be understated.

Rates of mortality declined throughout the 20th century and have continued to decline, which means that, in general, people are living longer. Consequently, we anticipate that mortality tables will need to be updated periodically to reflect actual mortality trends, even if we are anticipating some increase in longevity. Because of potential differences in mortality, we break down our study by gender (males and females) and by status (healthy retirees, disabled retirees, and active members).

Because of the substantial amount of data required to construct a mortality table, actuaries usually rely on standard tables published by the Society of Actuaries. Actuaries then use various adjustments to these standard, published mortality tables in order to better match the observed mortality rates of a specific group, including:
- (1) Age adjustments
- (2) Collar adjustment (White Collar and Blue Collar)
- (3) Scaling of rates

The first of these adjustments is an age adjustment that can be either a "set back" or a "set forward". A one-year age set forward treats members as if they were one year older than they truly are when applying the rates in the mortality table. So, a one year set forward would treat a 61 year old retiree as if he will exhibit the mortality of a 62 year old in the standard mortality table.

The second adjustment is called a collar adjustment. There are both "white collar" and "blue collar" variants of some of the newer mortality tables that reflect different mortality patterns. These variants, whose use is not necessarily limited to populations that have only white or blue collar employees, provide options which may result in a better fit of the assumed mortality table to the actual experience.

A third adjustment, which requires a significant amount of data, that can be used to adjust the mortality rates in a standard table to better fit actual experience is to "scale" a mortality table by multiplying the probabilities of death by factors less than one (to reflect better mortality) or factors greater than one (to reflect poorer mortality). Scaling factors can be applied to an entire table or a portion of the table. Of course, if needed, actuaries may use two or even all three of these methods to develop an appropriate table to model the mortality of the specific plan population.

The issue of future mortality improvement is one that the actuarial profession is very focused on and continues to study and monitor trends. This has resulted in changes to the relevant Actuarial Standard of Practice, ASOP 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations.* This ASOP requires the pension actuary to make and disclose a specific recommendation with respect to future improvements in mortality after the valuation date, although it does not require that an actuary assume there will be future improvements. There have been significant improvements in longevity in the past, although there are different opinions about future expectations, and thus there is a subjective component in the estimation of future mortality improvements.

There are two widely-used ways to reflect future improvements in mortality:
- (1) Static table with "margin"
- (2) Generational mortality

Static Tables with Margin

The first approach to reflecting mortality improvements is through the use of a static mortality table with "margin." Under this approach, the Actual to Expected Ratio is intentionally targeted to be over 100% so that mortality can improve without creating actuarial losses. This approach is mandated by the Internal Revenue Service for determining minimum funding amounts for corporate pension plans as mortality improvements are projected seven years for retirees and 15 years for actives. While there is no formal guideline for the amount of margin required (how far above 100% is appropriate for the Actual to Expected Ratio), we typically prefer to have a margin of around 10% at the core retirement ages. The goal is still for the general shape of the curve to be a reasonable fit to the observed experience. Depending on the magnitude and duration of mortality improvement, the margin would decrease and eventually may become insufficient. When that occurs, the assumption would need to be updated.

Generational Mortality

Another approach, referred to as generational mortality (currently used in the COERS valuation), directly anticipates future improvements in mortality by using a different set of mortality rates based on each year of birth, with the rates for later years of birth assuming lower mortality than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of mortality tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2040 has a longer life expectancy than a member who turns age 65 in 2020. When using generational mortality, the Actual to Expected Ratios for the observed experience are set near 100% as future mortality improvements will be taken into account directly in the actuarial valuation process by applying lower probabilities of death. The generational approach is our preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with what we believe is more likely to occur. This is the method currently used in the COERS valuation and we recommend it continue to be used.

Healthy Retirees: The current mortality table used to anticipate the duration of benefit payments to members in-pay status is the RP-2000 Healthy Annuitant Mortality Table, with a one-year age set forward for both males and females, and future mortality improvements using Projection Scale AA (which was recommended for use with the RP-2000 Table).

In examining the results of the Experience Study, if the A/E Ratio is greater than 100%, the assumptions have predicted fewer deaths than actually occurred and with an A/E Ratio less than 100%, the assumptions have predicted more deaths than have actually occurred.

In this experience study, we also analyzed recent experience on a benefit-weighted basis where the exposures and deaths are multiplied by the monthly retirement benefit amount. This helps to reflect any differences that arise from better mortality experience among those with larger benefits. Because a valuation is designed to measure the amount and timing of future benefit payments (liability) rather than simply the number of retirees leaving pay status, this benefit-weighted approach is an important factor in developing a mortality assumption to value plan obligations. The Actual to Expected Ratios on a benefit-weighted basis were materially different from the Actual to Expected Ratios on a count basis, indicating that members with higher benefits tend to have better mortality. Please note that we are not saying that larger benefits lead to better mortality, but simply that there is a correlation between the two.

The aggregate observed experience for healthy (not disabled) male and female retirees, ages 55 to 90, during the study period is shown in the following chart.

All Healthy Retirees (2012-2015)					
		Observations		A/E Ratio Current (Count)	A/E Ratio Current (Weighted)
	Exposure	Actual	Expected		
Males	2,579	67	71	94%	85%
Females	1,184	22	24	92%	76%
Total	3,763	89	95	94%	83%

Because we are using generational mortality, the Actual to Expected Ratios should be near 100% as future mortality improvements will be taken into account directly in the actuarial valuation process. Actual deaths during the study period were 67 for males compared to an expected number of 71 (A/E ratio of 94%) on a count basis, a difference of four deaths over a four year period. However, the A/E ratio on a benefit-weighted basis was much lower, 85%. For females, there were 22 deaths compared to 24 expected during the four year period, with a resulting A/E ratio of 92%. However, on a benefit-weighted basis, the A/E ratio was 76%. It is worth noting that the size of the female group is much smaller than the males so less credibility can be assigned to their actual experience.

The A/E ratios for males and females in the last experience study were 103% and 143% respectively. These were on a count basis so they compare to the ratios in the current study of 94% and 92%. Improvements in mortality tend to unfold very gradually over long periods of time so a dramatic change such as evidenced in these A/E ratios is likely a function of the expected variability of results, given the size of the group, rather than a change in the underlying mortality rates. Still, the benefit-weighted results indicate that some adjustment is appropriate. Therefore, we believe it is prudent to change the mortality assumption to reflect more longevity, but not to move all of the way to reflect the benefit-weighted experience. As more data becomes available on a benefit-weighted basis in future experience studies, adjustments to the mortality assumption can be made.

The Society of Actuaries published an updated mortality table in October, 2014, called the RP-2014 Mortality Table. They reported that actual mortality improvements since the RP-2000 Table was published were greater than anticipated by Scale AA, which was recommended for use with the RP-2000 Mortality Table for purposes of projecting future mortality improvements. The RP-2014 Mortality Table is based on the most recent private retirement plan mortality experience and will replace the RP-2000 Table as the current mortality table standard for use in valuations of corporate pension plans. A projection scale was also published with the RP-2014 Table for use in projecting future mortality improvements (called the MP-2014 Scale). This projection scale is updated annually by the Society of Actuaries so the MP-2015 and MP-2016 Scales have since been published.

The following graph displays the actual male mortality rates (blue bars) compared to the current (red line) and proposed (green line) assumptions at the key retirement ages of 65 through 90. Our desire was to more closely match the actual experience at these ages because the credibility of that experience is greater due to the number of exposure.
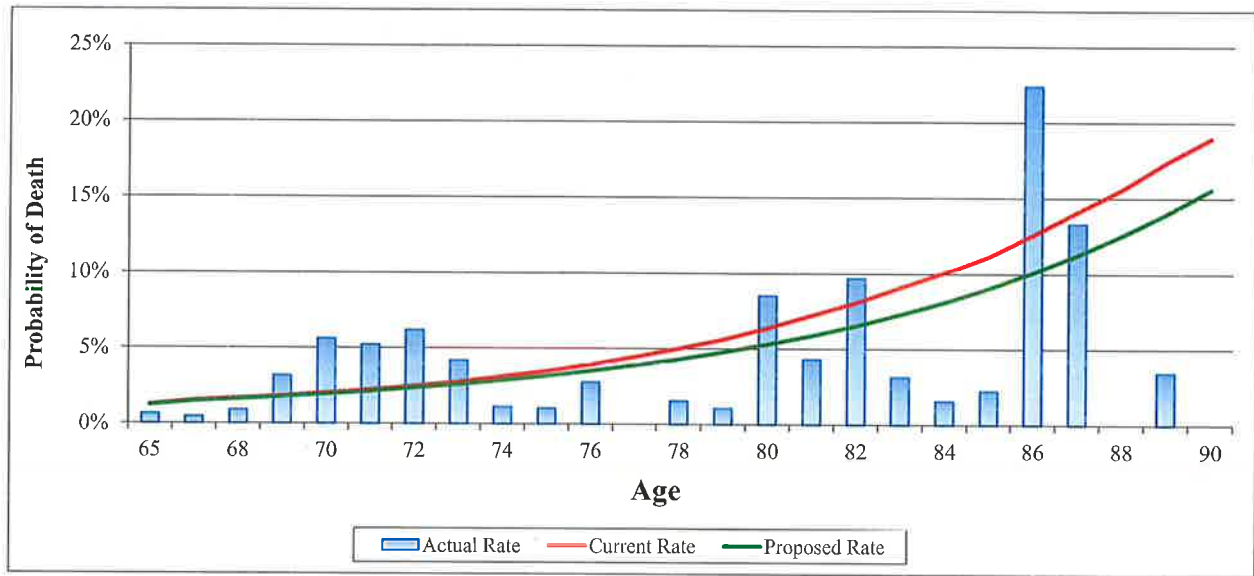
If the mortality assumption is to be updated, we believe it is appropriate to use the most recently published mortality tables (RP-2014 Mortality Tables) as the basis for selecting an assumption for the COERS valuation, with standard adjustments to better fit the observed experience. Due to the size of the group, a close fit of actual experience to the assumed rates is not expected at all ages. In addition, there was rather dramatic variation in the A/E ratios from the prior study to the current study so significant credibility cannot be assigned to these study results. This is also the first experience study to include mortality analysis on a benefit-weighted basis. While we considered the general trend in our analysis, the recommended assumption was not set with an intent for a resulting A/E ratio of 100% on a benefit-weighted basis. The next study will provide additional insight into the benefit-weighted analysis of mortality for this group. We prefer to use a projection scale that is more reflective of mortality experience in the state of Nebraska as compared to the published projection scale. The Nebraska Public Employees Retirement System recently performed an experience study and adopted new assumptions, including a mortality improvement scale. **We recommend the Board adopt the following mortality assumption for males: the RP-2014 Mortality Table, Adjusted to 2006 (reflecting the 2006 base mortality rates) for males, with the ultimate projection scale used by the Nebraska Public Employees Retirement System.** This assumption produced an A/E ratio of 103% on a count basis and 91% on a benefit-weighted basis at ages 55 to 90.

For females, there is much less data (so no graph is shown), so we recommend a female table on a consistent basis. **We recommend the Board adopt the following mortality assumption for females: the RP-2014 Mortality Table, Adjusted to 2006 (reflecting the 2006 base mortality rates) for females, with the ultimate projection scale used by the Nebraska Public Employees Retirement System.** This produces an A/E ratio of 92% on a count basis and 76% on a benefit-weighted basis at ages 55 to 90.

Disabled Retirees: Typically, the mortality rates of disabled retirees are higher than that of healthy retirees. The current assumption is the RP-2000 Disabled Life Table with generational improvements using Scale

AA. There is far too little data to perform any reliable analysis so our recommendation is based on professional judgment. We prefer to use a table for disabled members that is in the family of RP-2014 Tables. **Therefore, we recommend the RP-2014 Disabled Mortality Table, Adjusted to 2006, with the ultimate projection scale used by the Nebraska Public Employees Retirement System applied from 2006 forward, be used to value members in the valuation who are disabled.**

Beneficiaries: The mortality of beneficiaries applies to the survivors of members who have elected a joint and survivor option. There is insufficient data to analyze and rely on those results to set an assumption. **We recommend that standard convention be followed and the mortality for beneficiaries be set to the same basis as is used for retired members.**

Active Members: This assumption predicts eligibility for death benefits for active employees prior to retirement, rather than the expected lifetime for pension payments. In smaller groups, the mortality rates for active members are often set based on the same assumption as is used for healthy retirees. Given the low probability of death while active, the results cannot be credible on their own without much larger numbers of employees than are in the COERS active group. We prefer to keep the mortality assumption for active and retired members on a consistent basis. **Therefore, we recommend the active member mortality be set to the RP-2014 Mortality Table, Adjusted to 2006 (reflecting the 2006 base mortality rates), with the ultimate projection scale used by the Nebraska Public Employees Retirement System to reflect future mortality improvements from 2006 forward.**

SERVICE RETIREMENT

Service retirement measures the change in status from active membership directly to retirement. This assumption does not include the retirement patterns of members who terminated from active membership years prior to their retirement. A separate assumption addresses that situation.

While there are two benefit tiers for active members of the Omaha Employees' Retirement System, the new tier was effective in March, 2015. As a result, it was not in effect for most of the study period. In addition, it will be many years before there is a sufficient number of members eligible to retirement to produce credible findings. Therefore, our analysis focuses only on the retirement provisions of Tier 1 members.

An active member of Tier 1 is eligible to retire on or after age 50 if their age plus service is 80 or more (referred to as Rule of 80). Otherwise, a member may retire on or after age 55 with 5 years of service (early retirement). The benefit amount is reduced 8% per year for commencement prior to age 60 unless the Rule of 80 is met. Separate retirement assumptions are used for early retirement, retirement when the member is first eligible for unreduced benefits (referred to as the "select" period) and then after the initial year the member is eligible for unreduced benefits (referred to as the "ultimate" period) if they are still working.

We analyzed retirements for those eligible for each type of retirement, i.e. early (reduced) retirement, those in their first year of eligibility for unreduced retirement, and those who have been eligible for unreduced retirement for over a year. Our findings are summarized in the following table:

	All Retirements 2012 Through 2015			
	Observations		A/E Ratio	
	Actual	Expected	Count	Weighted
Early Retirement	10	22	45%	39%
1st Year Eligible for Unreduced Benefit	33	63	52%	60%
After 1st Year Eligible for Unreduced Benefit	133	154	86%	96%

The actual retirement rates for early retirement are compared to the current and recommended actuarial assumption in the graph below:

Early Retirement
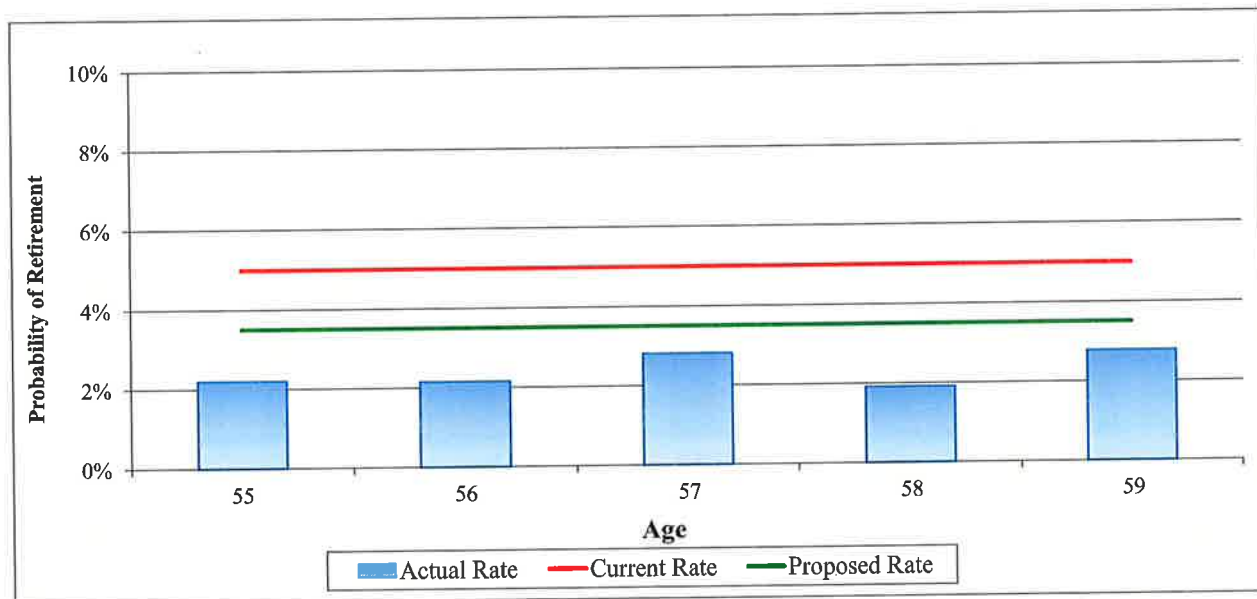
The current early retirement rates are fairly low, 5% per year. However, during the study period there were only 10 actual retirements compared to 22 expected, with a resulting A/E ratio of 45% on a count basis. On a liability-weighted basis, the A/E ratio was 39%. Although the A/E ratio appears very low, it is important to remember that the number of retirements is small. One additional retirement in each year would have moved the A/E ratio from 45% to 64%. In evaluating the assumption, we also considered the results of the prior experience study which indicated that the current assumption resulted in an A/E ratio of 66% (19 actual compared to 29 expected). Given the consistent experience over the last two study periods, **we recommend the current retirement rates for early retirement be reduced from 5% to 3.5%. The resulting A/E ratio is 67% on a count basis and 56% on a liability-weighted basis.**

The actual retirement rates for service retirements in the first year of eligibility are compared to the current and proposed actuarial assumptions in the following graph:

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1ˢᵗ Year Eligible for Unreduced Benefits
(Select Period)
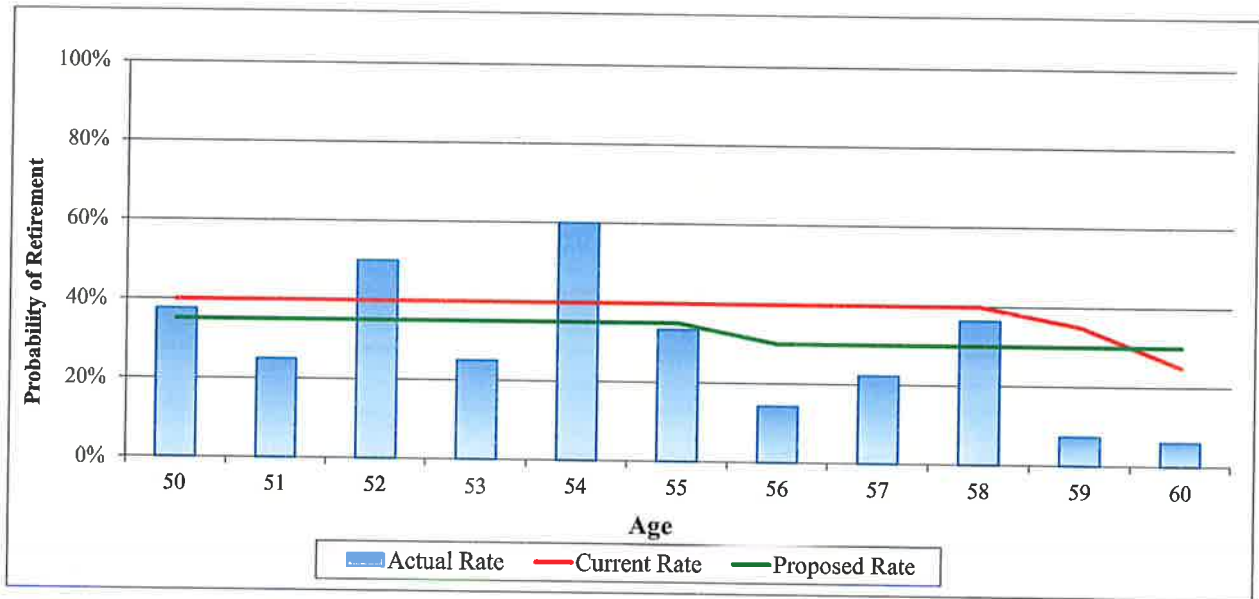
In the last experience study, the current assumption resulted in an A/E ratio of 92% indicating the actual retirements in that study period were just slightly lower than the assumption would have anticipated. During the current study period, overall there were fewer retirements in the select period than expected (33 actual vs 63 expected with an A/E ratio of 52% on a count basis). On a liability-weighted analysis, the A/E ratio increases to 60%. The select retirement assumption was changed in the last experience study with an increase in the rates at ages below age 55. The pattern is very different in the current study period, but we are hesitant to make any significant changes given the small number of exposure, especially at the younger ages. **We recommend some small adjustments to the current rates, as shown in the green line in the graph above. The resulting A/E ratio using the recommended assumption, on a liability-weighted basis, is 68%.**

The actual retirement rates for service retirements after the first year of eligibility for unreduced benefits are compared to the current actuarial assumption in the following graph:

After 1st Year Eligible for Unreduced Benefits
(Ultimate)
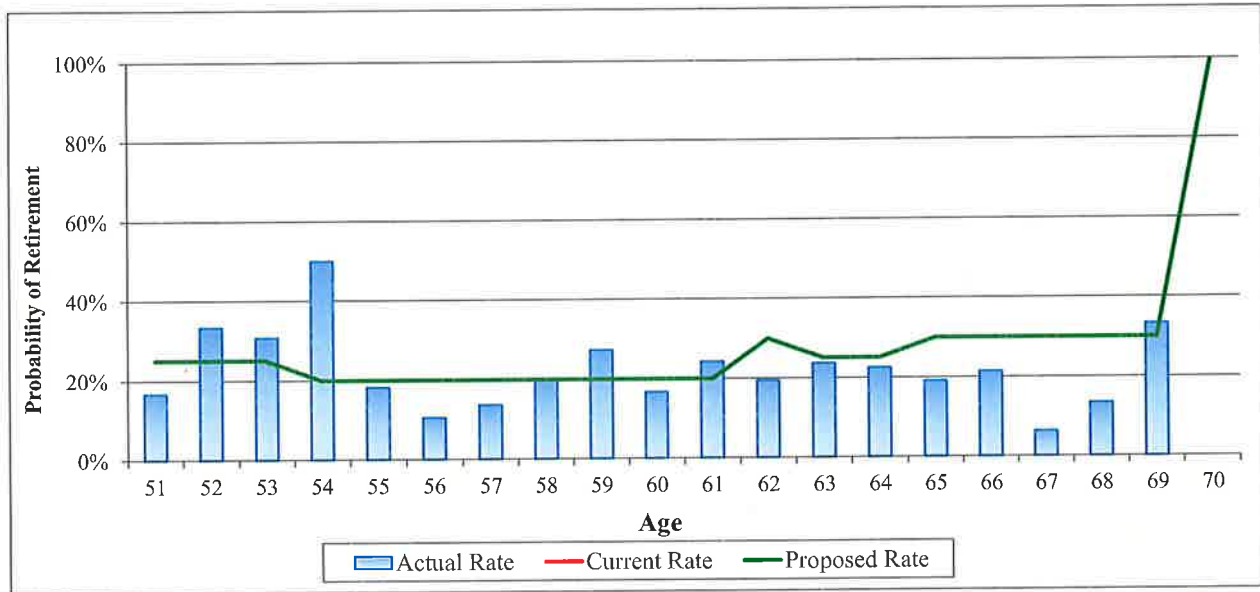
This assumption was changed in the last experience study to better fit the actual experience. In the current study period, the A/E ratio was 86% on a count basis and 96% on a liability-weighted basis. In addition, the pattern of retirement rates is good. As a result, the emerging retirement liabilities were closely modeled by the current assumption. Therefore, **we recommend the current assumption be retained.**

Cash Balance Members: It will be many years before there is enough data to analyze the retirement experience by active members who participate in the Cash Balance benefit structure. However, an assumption is needed in the actuarial valuation because we are projecting the benefit payments for current cash balance members to retirement ages to develop the related liabilities. Therefore, a retirement assumption for this group is necessary.

Currently, we utilize an age-based assumption that is similar to the Tier 1 retirement rates. The assumption is 5% probability of retirement from age 55 through 59, 7% at age 60 and 61, 20% at ages 62 through 64, 35% at age 65, 25% at age 66 and 20% from ages 67 through 69. Anyone age 70 or older is assumed to retire (100% probability). With a cash balance plan, the liabilities are not heavily impacted by the assumed retirement age as is typically the case in a traditional defined benefit plan (like Tier 1). **Therefore, the current assumption is reasonable and we recommend it continue to be used until there is sufficient data to analyze the actual experience of cash balance members.**

Inactive Vested Members: The current assumption is that inactive vested members covered by the traditional defined benefit plan will retire at age 60. There are few such members so no reliable data is available to evaluate this assumption. However, since age 60 is the first age at which benefits can commence unreduced, it is reasonable to expected most, if not all, of these members to retire at that time. **We recommend keeping the current assumption that benefits for Tier 1 inactive vested members will commencement at age 60 as it is a reasonable assumption and provides a conservative estimate of the liability for inactive vested members.**

When inactive vested members of the cash balance plan are assumed to terminate prior to reaching retirement eligibility, their liability is valued as the greater of the refund amount or the present value of

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future benefits. Therefore, an assumption as to the commencement date of the inactive vested benefit is needed. Currently, we assume the benefit will start when the member reaches normal retirement age, age 65. It will be many years before actual data is available to determine this assumption. Therefore, **we believe the current assumption is reasonable and we recommend it be retained.**

DISABILITY

The size of the System, coupled with the small probability of disablement at most ages, does not permit credible derivation of disability rates based solely on the System's experience. Nonetheless, the actual to expected ratio was calculated as a general indication of the overall fit of the assumption. The following table shows both the experience in the current and the prior two studies.

| | Disabilities | | |
| | Observations | | A/E Ratio |
	Actual	Expected	Current
2002-2006	30	27	111%
2007-2011	11	9	122%
2012-2015	<u>10</u>	<u>21</u>	48%
Total	51	57	89%

Over the last three experience studies, the current assumption reasonably anticipated the actual number of disabilities (six fewer disabilities than expected over a fourteen-year period). The A/E ratio in the current study is only 48%, but given the size of the group it is not unusual to have wide variability from one study period to the next. Furthermore, when only experience at ages over 30 is examined the A/E ratio is 91%. **Therefore, we recommend the current disability rates be retained.**

TERMINATION OF EMPLOYMENT

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, retirement, or disability. Rates of termination can vary by both age and years of service. In general, rates of termination tend to be highest at younger ages and in the early years of employment. The current assumption is based on years of service, starting at 13% in the first year and grading down to 2.5% at 17 or more years of service.

Since termination of employment often involves a decision by the member to voluntary leave covered employment, the actual experience can be heavily influenced by economic conditions.

As part of our analysis this time, we studied male and female experience separately. The results are shown below :

	Terminations			
	Observations		**A/E Ratio**	
	Actual	**Expected**	**Count**	**Weighted**
Males	96	124	78%	69%
Females	68	55	123%	110%
Total	164	179	92%	80%

This is the first time in recent years that analysis has been performed separately by gender. As the table above indicates, there is a significant difference in the termination patterns of males and females. This is not unusual and the observed patterns are similar to those seen in other systems. Given the dramatic difference in the termination rates by gender, we believe a gender-specific assumption will provide for a better estimate of future liabilities. Therefore, we recommend the following liability weighted termination of employment assumptions:

Termination of Employment – Males
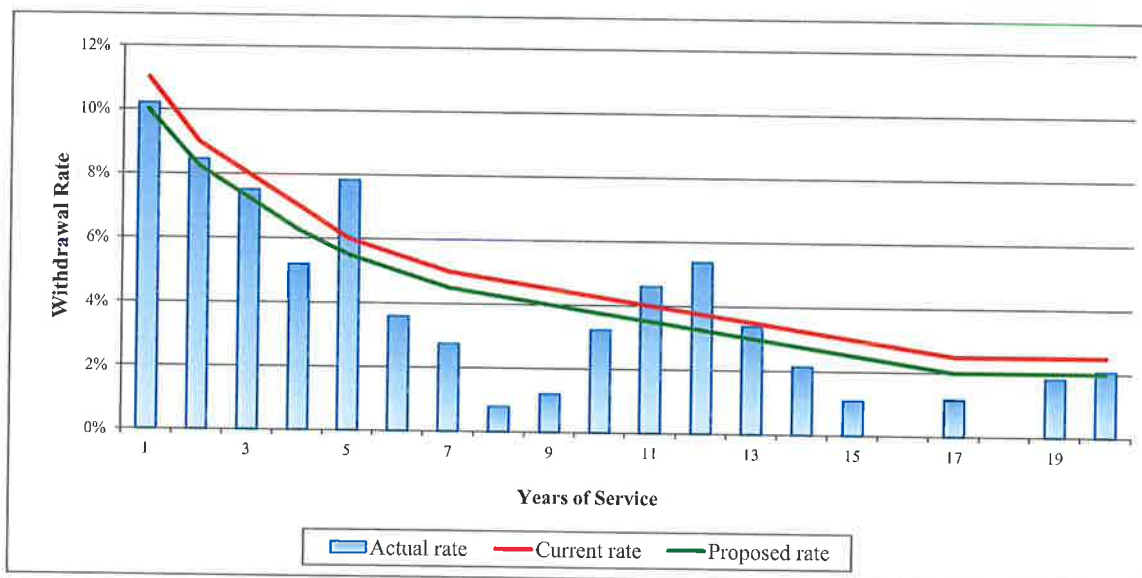
The A/E ratio for males, using the recommended assumption, is 79%. The recommended termination assumption for female members is shown below. The revised A/E ratio, based on the recommended assumption, is 99%.

Termination of Employment - Females
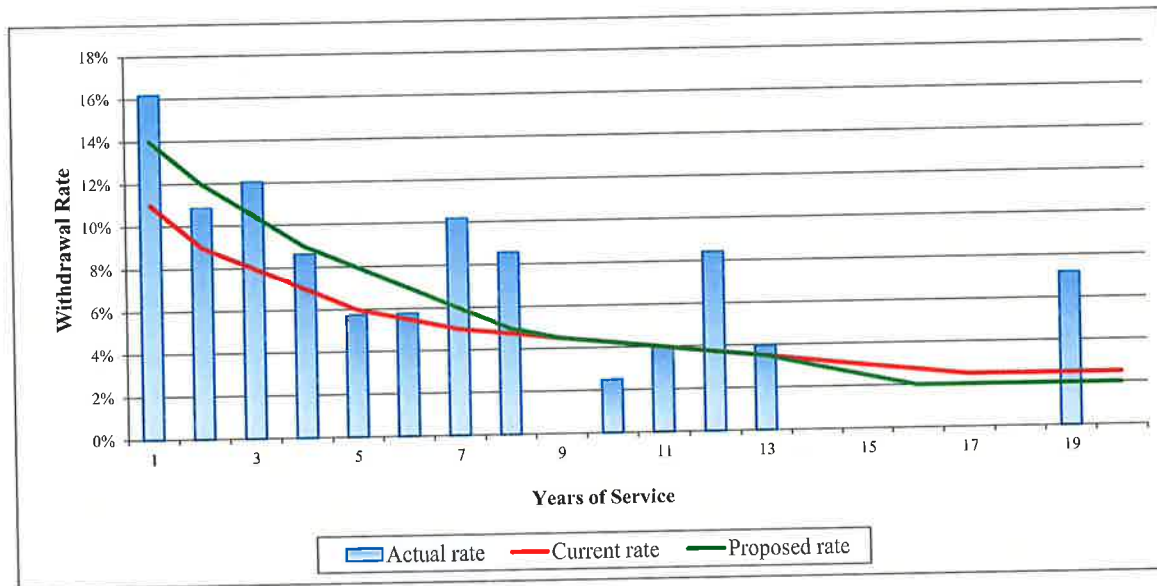
Withdrawal of Employee Contributions by Vested Terminating Members

For vested members who terminate employment, an age-based assumption is utilized to anticipate whether they will leave their member contributions with the System and receive a deferred benefit or elect to take a refund of the contributions and forfeit future benefits. Members who terminated in the last year of the study were excluded from our analysis due to potential timing issues. There may have been insufficient time to process their refund and thus it may not appear in the data, thus skewing the results. There were 61 vested members under age 55 who terminated employment during the four-year study period. Based on the current assumption, we expected 22 of them to take a deferred benefit, while 29 actually did with a resulting A/E ratio of 132%. (Note that some of them could have elected to withdraw their contributions in years not included in the study period.) In both the current and the prior two studies, we have observed that there is no real correlation of the experience to service or age. **Therefore, we recommend the assumption be changed to a uniform assumption of 50% of terminating, vested members elect to leave their employee contribution balance in the System in order to receive monthly benefits later.** The A/E ratio using the recommended assumption is 104%.

Due to the nature of the plan and benefit accruals, we expect the behavior of the cash balance members to likely be different than that observed for employees covered by the traditional defined benefit plan. Since it will be many years before credible data unfolds, **we recommend the valuation assume that cash balance members will elect the greater of the available refund amount or the present value of the deferred monthly benefit whichever is greater. This is the current assumption and it provides a reasonable and conservative assumption.**

SALARY INCREASE ASSUMPTION

Estimates of future salaries are based on assumptions for two types of increases:

1.   Increases in each individual's salary due to promotion or longevity (often called merit scale), and

2.   Increases in the general wage level of the membership, which are directly related to price and wage inflation.

Earlier in this report, we recommended that the second of these rates, general wage inflation reduced from 4.00% to 3.10% (2.60% price inflation and 0.50% real wage growth).

As noted above, future salary increases are the result of two components. Actual salary experience is reported in total, rather than by components, so the experience study reviewed total salary increases for the study period. The percentage attributable to general wage growth (which has already been analyzed and an assumption set) is eliminated so the merit scale is isolated. In order to isolate the merit scale, we reviewed the "across the board" increases that were granted during the study period. The actual increases granted resulted in an average annual increase of around 2.1%. The change in the national Average Wage Index for the same period was 2.85%. The actual experience, both locally and nationally, was considerably lower than the current actuarial assumption of 4.0%. Given this information, we would expect the total salary increases during the study period to be, on average, about 1% to 2% lower than the increase expected based on the current actuarial assumption.

As the table below illustrates, the total salary increases were about 1% lower than expected.

	Total Salary Increases		
Year	Actual	Expected	Difference
2012	4.33%	5.43%	(1.10%)
2013	4.25%	5.43%	(1.18%)
2014	4.23%	5.42%	(1.19%)
2015	4.31%	5.43%	(1.12%)
2012-2015	4.42%	5.43%	(1.01%)

The shape of the total salary increase assumption is a reasonable fit to the actual experience. Our total recommended decrease in the general wage increase assumption was 0.90% (down to 3.1% from 4.0%). With this adjustment, the total salary increase assumption is a good fit to the actual experience, as shown in the following graph: the observed increases for all years (the bars) are compared to the current assumption (the red line) and the proposed assumption (green line).
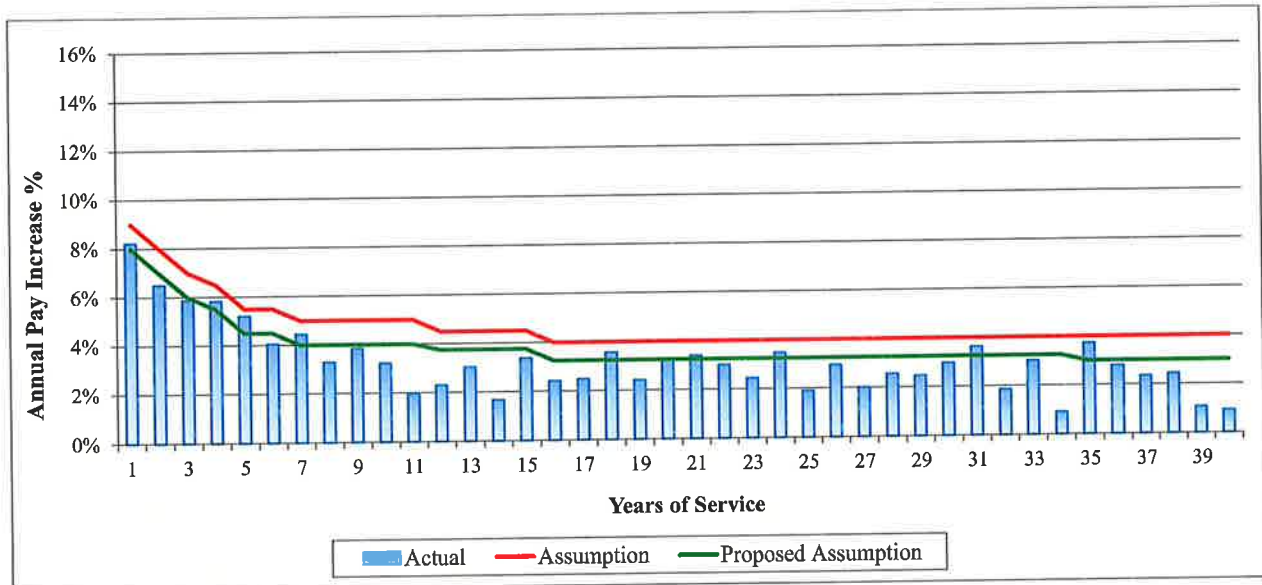
We recommend that the current total salary increase assumption be modified as shown in the graph above by adjusting only the general wage increase assumption, as discussed earlier in this report (no change to the merit scale).

Interest: 8.00% per year, net of investment expenses.

Inflation: 3.25% per year, net of investment expenses.

Interest Credited to Cash Balance Accounts: 6.25% per year

Salary Increases:

Annual Rate of Increase For Sample Years

Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	3.25%	.75%	5.0%	9.0%
5	3.25%	.75%	1.5%	5.5%
10	3.25%	.75%	1.0%	5.0%
15	3.25%	.75%	0.5%	4.5%
20+	3.25%	.75%	0.0%	4.0%

Payroll Growth Assumption 4.0%

Service Retirement Age

Members within 5 Years of Unreduced Retirement Eligibility as of March 1, 2015

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
50-53	40%	25%
54-58	40%	20%
59	35%	20%
60	25%	20%
61		20%
62		30%
63-64		25%
65-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 5% per year from age 55 to 59.

**Members within 6-10 Years of Unreduced
Retirement Eligibility as of March 1, 2015**

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
50-53	40%	25%
54-60	40%	20%
61	35%	20%
62	35%	30%
63-64		25%
65-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 5% per year from age 57 to 61.

**Members more than 10 Years from Unreduced
Retirement Eligibility as of March 1, 2015**

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
50-53	40%	25%
54-61	40%	20%
62	40%	30%
63-64	35%	25%
65	35%	30%
66-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 5% per year from age 60 to 64.

Members Hired on or After March 1, 2015

Age	Probability Of Retirement
55-59	5%
60-61	7%
62-64	20%
65	35%
66	25%
67-69	20%
70	100%

Deferred vested members are assumed to begin receiving benefits at age 60.

Decrement Timing   Middle of year

Mortality:

    Active Members   RP-2000 Employee Table with generational improvements using scale AA, set forward one year

    Pensioners   RP-2000 Healthy Annuitant Table with generational improvements using scale AA, set forward one year

    Disabled   RP-2000 Disabled Table with generational improvements

Disability:

Age	Annual Rate
20	0.11%
30	0.14%
40	0.19%
50	0.41%
60	1.48%

20% of disabilities are assumed to be service-connected.

Percent Married at Death or Retirement: 75%

Spouse Age Difference: Husbands assumed to be three years older than wives.

Number of Children per Married Member: 0

Termination:

SAMPLE RATES

Years of Service	Annual Rate
1	11.00%
5	6.00%
10	4.25%
15	3.00%
17+	2.50%

Vested Terminations
Electing Refund:

Age	Percent
34 and Below	100%
35-41	70%
42-46	50%
47	40%
48	30%
49	20%
50 and Above	0%

For members hired on or after March 1, 2015, everyone who becomes vested is expected to take a deferred annuity at age 60.

Interest:	7.50% per year, net of investment expenses.
Inflation:	2.50% per year, net of investment expenses.
Interest Credited to Cash Balance Accounts:	6.00% per year

Salary Increases:

Annual Rate of Increase For Sample Years

Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.60%	4.90%	8.00%
5	2.50%	0.60%	1.40%	4.50%
10	2.50%	0.60%	0.90%	4.00%
15	2.50%	0.60%	0.65%	3.75%
20	2.50%	0.60%	0.15%	3.25%
25	2.50%	0.60%	0.15%	3.25%
30	2.50%	0.60%	0.15%	3.25%
35+	2.50%	0.60%	0.00%	3.10%

Payroll Growth Assumption   3.00%

Service Retirement Age

Members within 5 Years of Unreduced Retirement Eligibility as of March 1, 2015

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
50-53	35%	25%
54-55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64	25%	25%
65-69	50%	30%
70	100%	100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 3.50% per year from age 55 to 59.

**Members within 6-10 Years of Unreduced
Retirement Eligibility as of March 1, 2015**

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64		25%
65-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 3.50% per year from age 57 to 61.

**Members more than 10 Years from Unreduced
Retirement Eligibility as of March 1, 2015**

Eligible for Unreduced Retirement

Age	1st Year Eligible	Subsequent Years
55	35%	20%
56-60	30%	20%
61	25%	20%
62	25%	30%
63-64	25%	25%
65	50%	30%
66-69		30%
70		100%

Members eligible for Early, but not Unreduced Retirement, are assumed to retire at a rate of 3.50% per year from age 60 to 64.

Members Hired on or After March 1, 2015

Age	Probability Of Retirement
55-59	5%
60-61	7%
62-64	20%
65	35%
66	25%
67-69	20%
70	100%

Decrement Timing   Middle of year

Mortality:

    Active Members   RP-2014 Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the ultimate projection scale used by the Nebraska Public Employees Retirement System

    Pensioners   RP-2014 Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the ultimate projection scale used by the Nebraska Public Employees Retirement System

    Disabled   RP-2014 Disabled Mortality Table, adjusted to 2006 (reflecting the 2006 base mortality rates), with generational projection using the MP-2016 scale

Disability:

Age	Annual Rate
20	0.11%
30	0.14%
40	0.19%
50	0.41%
60	1.48%

20% of disabilities are assumed to be service-connected.

Percent Married at Death or Retirement: 75%

Spouse Age Difference: Husbands assumed to be three years older than wives.

Number of Children per Married Member: 0

Termination:

Years of Service	Annual Rate	
	Male	Female
0	11.00%	15.00%
1	10.00%	14.00%
2	8.25%	12.00%
3	7.25%	10.50%
4	6.25%	9.00%
5	5.50%	8.00%
6	5.00%	7.00%
7	4.50%	6.00%
8	4.25%	5.00%
9	4.00%	4.50%
10	3.75%	4.30%
11	3.50%	4.00%
12	3.25%	3.80%
13	3.00%	3.50%
14	2.75%	3.00%
15	2.50%	2.50%
16	2.25%	2.00%
17+	2.00%	2.00%

Vested Terminations Electing Refund: 50% of members with less than 20 years of service.

For members hired on or after March 1, 2015, members are assumed to take the more valuable of a lump sum or the present value of an annuity at age 60.

Moderate Growth Inputs - 2017

Assumes 2% inflation rate and Moderate Growth Supercycle and Moderate Growth Economic Environment

Asset Class	Expected Return	Standard Deviation	Geometric Return
Large Cap Stocks	7.9	19.5	6.1
Mid Cap Stocks	8.7	22.5	6.3
Small Cap Stocks	9.5	24.5	6.7
Micro Cap Stocks	9.5	27.0	6.1
International Stocks	9.6	21.0	7.6
International Small Cap Stocks	10.0	25.0	7.1
Global Developed	8.5	20.1	6.6
Emerging Markets Stocks	13.6	26.5	10.5
Public REITS	6.5	18.5	4.9
Energy Infrastructure	10.0	21.0	8.0
Commodities	5.7	19.0	4.0
Cash	1.7	1.6	1.7
TIPS	2.1	6.0	1.9
Short Bonds	1.0	3.2	0.9
Intermediate Bonds	1.4	4.3	1.3
Long Bonds	2.4	11.0	1.8
Bank Loans	4.4	7.8	4.1

Asset Class	Expected Return	Standard Deviation	Geometric Return
High Yield	6.0	10.5	5.5
International Bonds	0.0	8.5	-0.4
Emerging Market Debt	5.6	11.0	5.0
Hedge Funds Conservative	4.2	6.0	4.0
Hedge Funds Strategic	5.9	9.5	5.5
Hedge Diversified	5.1	7.5	4.8
RE – Core	5.7	9.0	5.3
RE - Value Added	7.3	13.5	6.4
Timber	6.3	8.0	6.0
Private Equity	10.2	16.2	9.0
Buyouts	10.0	13.0	9.2
Venture Capital	12.4	25.0	9.6
Mezzanine	7.4	15.0	6.3
Distressed Debt	9.0	15.0	8.0
Private Debt	6.1	8.0	5.8
Secondary Private Equity	11.0	15.2	9.9
Global Tactical	7.0	18.4	5.4

Asset Class Correlations

Asset Class	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1. Large Cap Stocks	1.00																																	
2. Mid Cap Stocks	0.93	1.00																																
3. Small Cap Stocks	0.91	0.95	1.00																															
4. Micro Cap Stocks	0.88	0.91	0.98	1.00																														
5. International Stocks	0.81	0.85	0.70	0.80	1.00																													
6. International Small Cap Stocks	0.80	0.82	0.81	0.82	0.94	1.00																												
7. Global Developed	0.96	0.92	0.83	0.86	0.94	0.90	1.00																											
8. Emerging Markets Stocks	0.79	0.80	0.78	0.75	0.88	0.86	0.87	1.00																										
9. Public REITS	0.67	0.70	0.72	0.71	0.63	0.64	0.66	0.54	1.00																									
10. Energy Infrastructure	0.46	0.53	0.45	0.45	0.42	0.41	0.46	0.47	0.43	1.00																								
11. Commodities	0.34	0.43	0.31	0.28	0.46	0.47	0.43	0.49	0.32	0.51	1.00																							
12. Cash	-0.07	-0.13	-0.07	-0.14	-0.08	-0.14	-0.23	-0.05	-0.02	0.14	0.15	1.00																						
13. TIPS	-0.26	-0.19	-0.26	-0.25	-0.14	-0.07	-0.19	0.03	0.09	0.23	0.30	0.15	1.00																					
14. Short Bond	-0.39	-0.50	-0.23	-0.45	-0.31	-0.42	-0.37	-0.36	-0.14	-0.08	-0.14	0.33	0.47	1.00																				
15. Intermediate Bonds	0.06	-0.37	0.06	-0.40	-0.07	-0.25	-0.02	-0.20	0.05	0.05	-0.08	0.00	0.71	0.74	1.00																			
16. Long Bond	0.08	-0.33	0.06	-0.36	-0.03	-0.23	0.03	-0.19	0.05	0.05	-0.16	-0.15	0.54	0.50	0.86	1.00																		
17. Bank Loans	0.61	0.59	0.59	0.58	0.61	0.64	0.64	0.63	0.17	0.62	0.53	-0.10	0.01	-0.41	-0.21	-0.27	1.00																	
18. High Yield	0.71	0.68	0.78	0.67	0.70	0.71	0.71	0.74	0.19	0.69	0.48	-0.16	0.02	-0.35	-0.08	-0.10	0.88	1.00																
19. International Bonds	-0.06	-0.11	-0.11	-0.11	-0.11	0.17	0.07	0.07	0.11	-0.06	0.18	0.02	0.17	-0.01	0.56	0.48	-0.13	0.02	1.00															
20. Emerging Market Debt	0.50	0.52	0.46	0.44	0.54	0.54	0.54	0.67	0.18	0.56	0.40	0.33	0.42	-0.38	0.35	0.29	0.58	0.76	0.29	1.00														
21. Hedge Funds Conservative	0.67	0.72	0.65	0.64	0.74	0.74	0.74	0.72	0.40	0.55	0.61	0.33	0.47	-0.46	-0.28	-0.34	0.78	0.71	-0.08	0.89	1.00													
22. Hedge Funds Strategic	0.78	0.81	0.77	0.77	0.83	0.83	0.84	0.86	0.61	0.58	0.49	0.24	0.05	-0.40	-0.35	-0.33	0.63	0.68	-0.10	0.48	0.96	1.00												
23. Hedge Funds Diversified	0.70	0.74	0.69	0.68	0.79	0.79	0.78	0.80	0.53	0.47	0.53	-0.05	0.01	-0.04	-0.33	-0.46	0.69	0.69	-0.06	0.49	0.96	0.96	1.00											
24. RE - Core	0.15	0.11	0.11	0.11	0.10	0.06	0.13	0.00	0.21	-0.03	0.21	-0.05	-0.03	-0.04	-0.18	-0.27	-0.04	-0.12	-0.08	-0.08	0.25	0.16	0.18	1.00										
25. RE - Value Added	0.15	0.11	0.11	0.11	0.10	0.06	0.13	0.13	0.21	-0.03	0.33	-0.18	-0.03	-0.04	-0.18	-0.29	-0.04	-0.12	-0.08	-0.08	0.25	0.16	0.18	0.95	1.00									
26. Timber	-0.05	-0.07	-0.08	-0.09	0.04	0.01	0.00	-0.02	0.24	-0.20	-0.06	0.24	-0.01	0.12	0.04	-0.12	0.06	-0.16	0.09	-0.66	0.06	0.11	0.11	0.23	0.23	1.00								
27. Private Equity	0.73	0.66	0.67	0.58	0.70	0.65	0.74	0.63	0.43	0.49	0.40	-0.05	-0.11	-0.49	-0.38	-0.12	0.49	0.51	-0.07	0.32	0.69	0.75	0.70	0.49	0.49	0.30	1.00							
28. Buyouts	0.77	0.70	0.70	0.62	0.77	0.71	0.80	0.68	0.43	0.52	0.43	-0.05	-0.05	-0.48	-0.37	0.06	0.52	0.54	0.01	0.36	0.72	0.76	0.73	0.46	0.46	0.27	0.96	1.00						
29. Venture Capital	0.48	0.41	0.38	0.34	0.39	0.34	0.45	0.29	0.14	0.14	0.14	0.14	-0.20	-0.44	-0.32	-0.30	0.27	0.27	-0.24	0.65	0.35	0.47	0.39	0.30	0.30	0.33	0.76	0.63	1.00					
30. Mezzanine	0.66	0.61	0.60	0.54	0.68	0.61	0.69	0.61	0.36	0.37	0.36	0.01	0.01	-0.46	-0.34	-0.31	0.39	0.40	-0.03	0.26	0.64	0.71	0.69	0.44	0.44	0.21	0.76	0.80	0.52	1.00				
31. Distressed Debt	0.71	0.76	0.74	0.75	0.76	0.78	0.77	0.74	0.56	0.70	0.56	-0.02	0.03	-0.36	-0.26	-0.21	0.79	0.82	0.01	0.56	0.86	0.81	0.82	0.10	0.10	-0.06	0.64	0.68	0.25	0.57	1.00			
32. Private Debt	0.61	0.66	0.59	0.58	0.61	0.61	0.64	0.64	0.53	0.62	0.53	-0.10	-0.13	-0.41	-0.21	-0.19	0.95	0.88	-0.13	0.58	0.78	0.63	0.69	-0.04	-0.04	-0.18	0.49	0.52	0.27	0.39	0.79	1.00		
33. Secondary Private Equity	0.73	0.66	0.63	0.58	0.70	0.65	0.64	0.63	0.40	0.36	0.40	-0.05	-0.11	-0.49	-0.38	-0.31	0.49	0.51	-0.07	0.32	0.69	0.75	0.70	0.49	0.49	0.30	0.95	0.96	0.76	0.76	0.64	0.49	1.00	
34. Global Tactical	0.67	0.72	0.65	0.64	0.74	0.74	0.74	0.72	0.61	0.62	0.61	0.07	0.05	-0.38	-0.28	-0.34	0.78	0.71	-0.08	0.49	0.95	0.89	0.96	0.25	0.25	0.06	0.69	0.72	0.35	0.64	0.86	0.78	0.69	1.00

Secular Inputs – 2017

Assumes 2.7% long-term inflation rate.

Asset Class	Expected Return	Standard Deviation	Geometric Return
Large Cap Stocks	9.3	17.0	8.0
Mid Cap Stocks	9.8	19.5	8.1
Small Cap Stocks	10.7	23.0	8.3
Micro Cap Stocks	11.1	26.0	8.0
International Stocks	9.8	20.0	8.0
International Small Cap Stocks	10.9	24.0	8.3
Global Developed	9.5	18.5	7.9
Emerging Markets Stocks	11.8	27.0	8.5
Public REITS	9.6	19.5	7.9
Energy Infrastructure	10.2	20.0	8.4
Commodities	8.5	20.0	6.6
Cash	3.1	1.5	3.1
TIPS	4.7	6.0	4.5
Short Bonds	4.2	4.0	4.1
Intermediate Bonds	5.2	6.1	5.0
Long Bonds	5.6	9.7	5.2
Bank Loans	6.3	8.0	6.0

Asset Class	Expected Return	Standard Deviation	Geometric Return
High Yield	7.7	10.0	7.2
International Bonds	5.3	10.5	4.8
Emerging Market Debt	7.3	11.0	6.7
Hedge Funds Conservative	5.7	6.0	5.5
Hedge Funds Strategic	7.7	9.0	7.3
Hedge Funds Diversified	6.7	8.0	6.4
RE - Core	7.9	7.0	7.7
RE - Value Added	9.4	11.0	8.8
Timber	7.0	8.5	6.7
Private Equity	11.8	13.6	11.0
Buyouts	11.7	12.0	11.1
Venture Capital	13.9	22.0	11.8
Mezzanine	9.3	10.5	8.8
Distressed Debt	10.7	10.5	10.2
Private Debt	6.4	8.0	6.1
Secondary Private Equity	11.2	15.2	10.2
Global Tactical	8.7	18.0	7.2

Asset Class Correlations

#	Asset Class	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	Large Cap Stocks	1.00																																	
2	Mid Cap Stocks	0.92	1.00																																
3	Small Cap Stocks	0.88	0.95	1.00																															
4	Micro Cap Stocks	0.88	0.91	0.98	1.00																														
5	International Stocks	0.74	0.71	0.64	0.80	1.00																													
6	International Small Cap Stocks	0.67	0.64	0.72	0.82	0.90	1.00																												
7	Global Developed	0.92	0.72	0.80	0.86	0.94	0.83	1.00																											
8	Emerging Markets Stocks	0.69	0.85	0.74	0.75	0.73	0.77	0.73	1.00																										
9	Public REITS	0.57	0.72	0.65	0.71	0.56	0.55	0.56	0.44	1.00																									
10	Energy Infrastructure	0.36	0.39	0.20	0.45	0.35	0.35	0.31	0.36	0.45	1.00																								
11	Commodities	0.20	0.25	0.20	0.28	0.31	0.31	0.34	0.48	0.06	0.11	1.00																							
12	Cash	-0.03	0.01	-0.06	-0.14	-0.03	-0.15	-0.23	-0.05	-0.07	0.25	0.31	1.00																						
13	TIPS	-0.28	-0.20	-0.27	-0.25	-0.23	-0.08	-0.19	-0.07	0.09	-0.12	0.13	0.50	1.00																					
14	Short Bond	0.06	-0.01	0.02	-0.45	-0.17	-0.40	-0.01	0.07	0.25	-0.07	0.24	0.45	0.89	1.00																				
15	Intermediate Bonds	0.09	0.08	0.05	-0.40	0.13	-0.26	0.07	0.10	0.07	-0.12	0.09	0.68	0.73	0.91	1.00																			
16	Long Bond	0.11	0.04	0.07	-0.36	0.13	-0.24	0.18	0.09	0.01	0.07	-0.17	0.24	0.54	0.73	0.91	1.00																		
17	Bank Loans	0.54	0.55	0.52	0.58	0.54	0.57	0.57	0.55	0.52	0.60	0.49	-0.03	0.13	-0.31	-0.16	-0.23	1.00																	
18	High Yield	0.63	0.63	0.63	0.67	0.58	0.62	0.64	0.66	0.59	0.37	0.20	-0.01	0.14	-0.02	0.16	0.09	0.84	1.00																
19	International Bonds	-0.07	-0.11	-0.18	-0.11	0.27	0.11	0.13	0.10	0.13	-0.07	0.12	0.15	0.30	0.04	-0.17	-0.10	-0.11	0.07	1.00															
20	Emerging Market Debt	0.48	0.50	0.48	0.44	0.43	0.35	0.47	0.39	0.47	0.39	0.23	0.07	0.30	0.07	0.25	0.21	0.32	0.50	0.04	1.00														
21	Hedge Funds Conservative	0.65	0.67	0.67	0.64	0.65	0.55	0.68	0.61	0.45	0.53	0.23	0.25	0.30	-0.19	-0.17	-0.24	0.65	0.61	-0.17	0.48	1.00													
22	Hedge Funds Strategic	0.57	0.59	0.57	0.57	0.69	0.52	0.55	0.55	0.31	0.53	0.31	0.25	0.03	0.02	-0.03	-0.12	0.45	0.43	-0.06	0.42	0.79	1.00												
23	Hedge Funds Diversified	0.65	0.68	0.68	0.77	0.69	0.69	0.69	0.69	0.34	0.41	0.41	0.16	-0.02	-0.08	-0.21	-0.23	0.49	0.51	-0.21	0.57	0.90	0.84	1.00											
24	RE - Core	0.09	0.05	0.05	0.11	0.01	0.01	0.08	-0.05	-0.05	0.17	0.24	0.24	-0.04	-0.03	-0.10	-0.10	-0.04	-0.15	-0.10	-0.05	0.13	0.03	0.15	1.00										
25	RE - Value Added	0.09	0.05	0.05	0.11	0.15	0.01	0.08	-0.05	-0.05	0.17	0.24	0.37	-0.03	-0.04	-0.12	-0.11	-0.04	-0.10	-0.10	-0.05	0.13	0.03	0.15	0.95	1.00									
26	Timber	0.02	0.00	-0.03	-0.01	0.03	0.01	0.03	-0.07	-0.07	-0.21	-0.08	0.16	0.32	0.06	-0.10	-0.05	-0.11	-0.06	0.02	-0.03	0.25	0.20	0.13	-0.02	-0.02	1.00								
27	Private Equity	0.56	0.55	0.58	0.58	0.52	0.39	0.52	0.30	0.30	0.16	0.31	0.32	0.10	-0.11	-0.05	-0.12	0.33	0.32	-0.12	0.37	0.71	0.62	0.69	-0.02	0.25	0.14	1.00							
28	Buyouts	0.57	0.53	0.51	0.62	0.59	0.44	0.59	0.43	0.30	0.28	0.32	0.10	-0.11	-0.12	-0.12	-0.07	0.40	0.42	0.04	0.37	0.65	0.44	0.56	0.34	0.34	0.12	0.83	1.00						
29	Venture Capital	0.44	0.42	0.44	0.34	0.39	0.35	0.39	0.22	0.07	0.13	0.13	0.10	-0.13	-0.18	-0.07	-0.07	0.14	0.13	-0.17	0.24	0.54	0.59	0.61	0.15	0.15	0.15	0.87	0.50	1.00					
30	Mezzanine	0.38	0.35	0.34	0.54	0.42	0.42	0.42	0.22	0.22	0.11	0.20	0.05	-0.11	-0.31	-0.25	-0.17	0.27	0.18	-0.05	0.17	0.51	0.42	0.46	0.30	0.30	0.10	0.45	0.40	0.45	1.00				
31	Distressed Debt	0.60	0.65	0.60	0.70	0.67	0.67	0.67	0.56	0.63	0.43	0.49	0.13	0.01	-0.17	-0.15	-0.23	0.69	0.76	-0.13	0.49	0.82	0.59	0.76	-0.01	-0.01	0.04	0.51	0.51	0.40	0.29	1.00			
32	Private Debt	0.54	0.55	0.52	0.58	0.52	0.57	0.52	0.55	0.55	0.14	0.29	-0.03	0.13	-0.22	-0.15	-0.23	0.95	0.84	-0.11	0.32	0.65	0.45	0.49	-0.04	-0.04	-0.11	0.33	0.28	0.40	0.27	0.69	1.00		
33	Secondary Private Equity	0.56	0.55	0.58	0.58	0.54	0.39	0.57	0.52	0.55	0.14	0.29	0.06	0.13	-0.31	-0.15	-0.05	0.33	0.32	-0.12	0.37	0.71	0.62	0.69	-0.04	0.25	0.14	0.95	0.83	0.87	0.53	0.51	0.33	1.00	
34	Global Tactical	0.65	0.62	0.64	0.58	0.62	0.55	0.65	0.62	0.61	0.47	0.53	0.25	0.03	-0.17	-0.17	-0.24	0.65	0.61	-0.17	0.48	0.95	0.72	0.90	0.21	0.21	0.15	0.71	0.65	0.54	0.51	0.82	0.65	0.71	1.00

EXHIBIT D-1
Retiree Mortality - Males
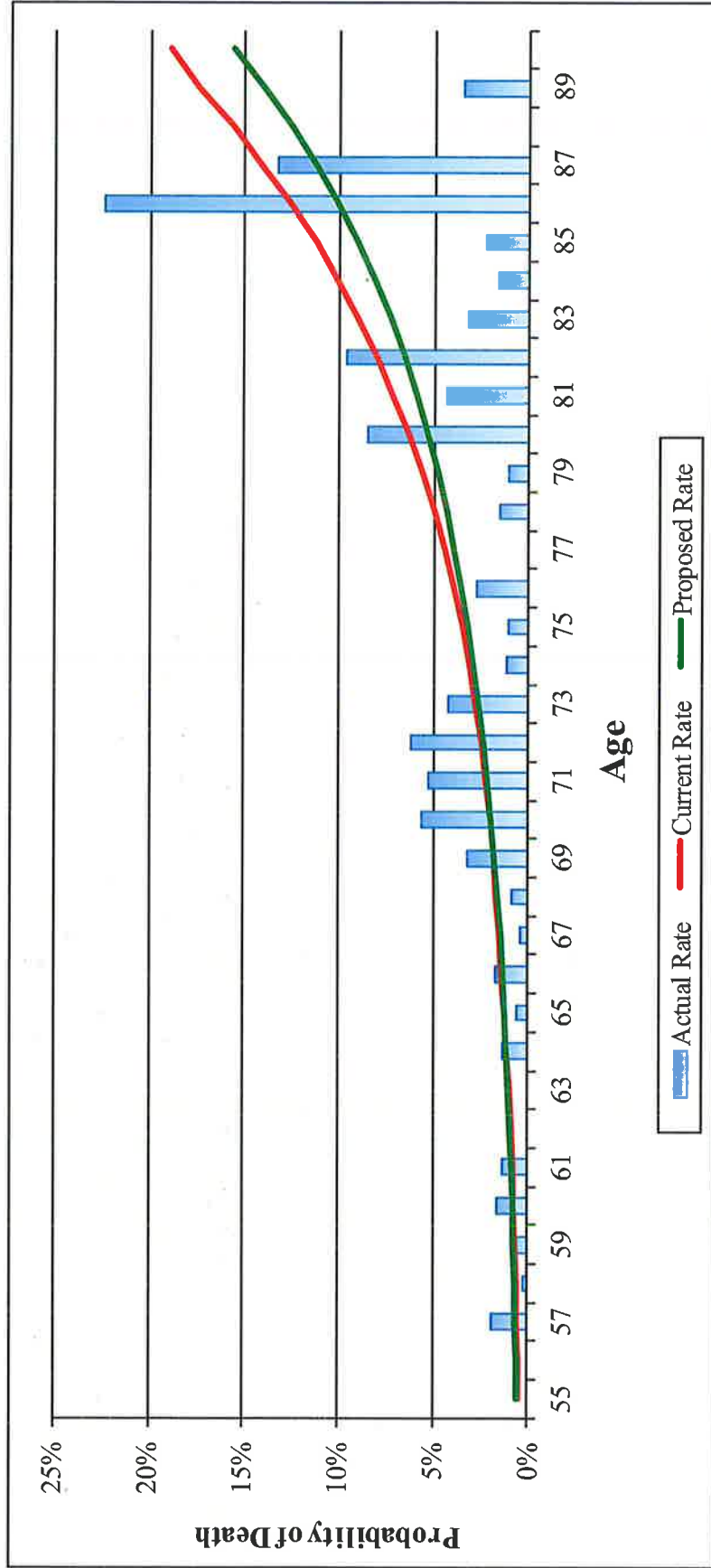
	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual/Expected		85%	94%

EXHIBIT D-2
Retiree Mortality - Females
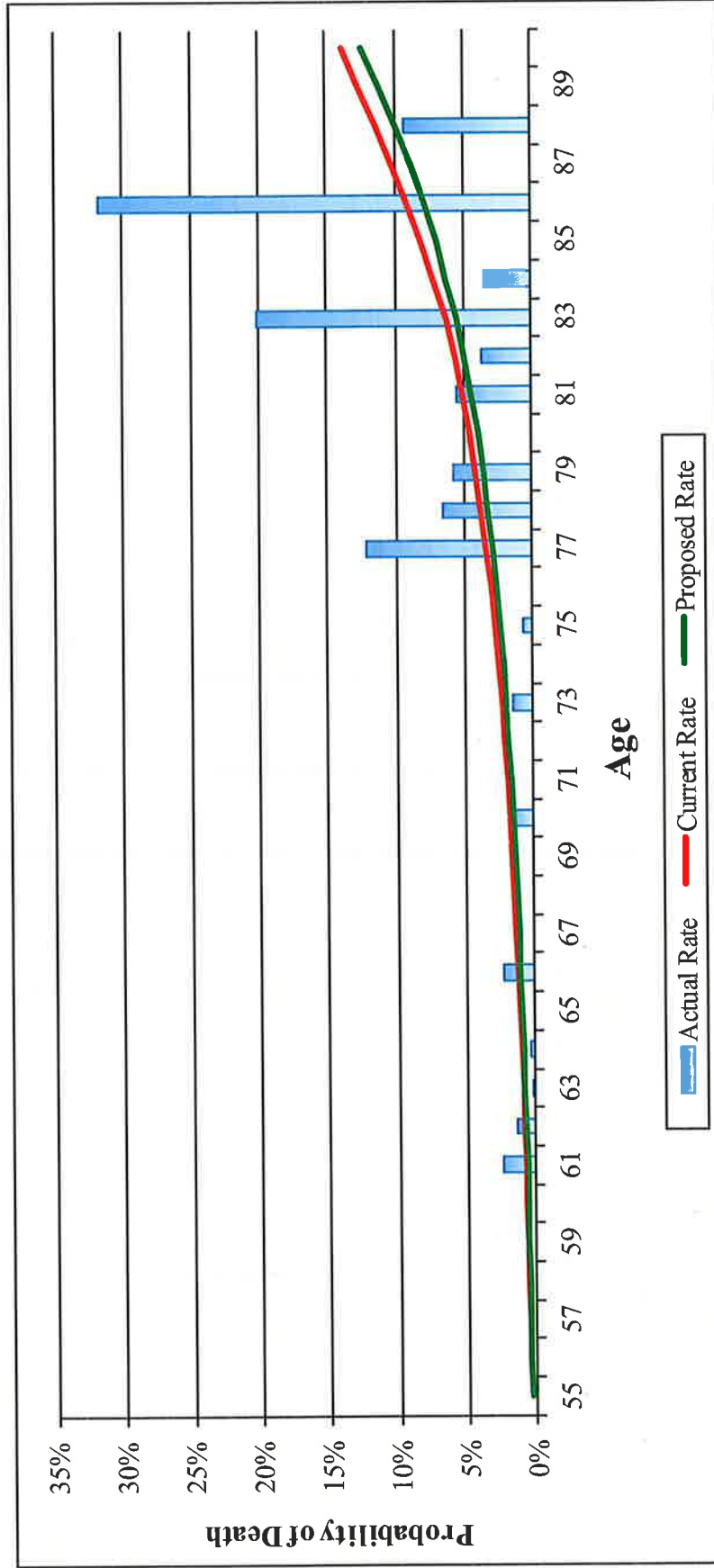
	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual/Expected		76%	87%

EXHIBIT D-3
Early Retirement
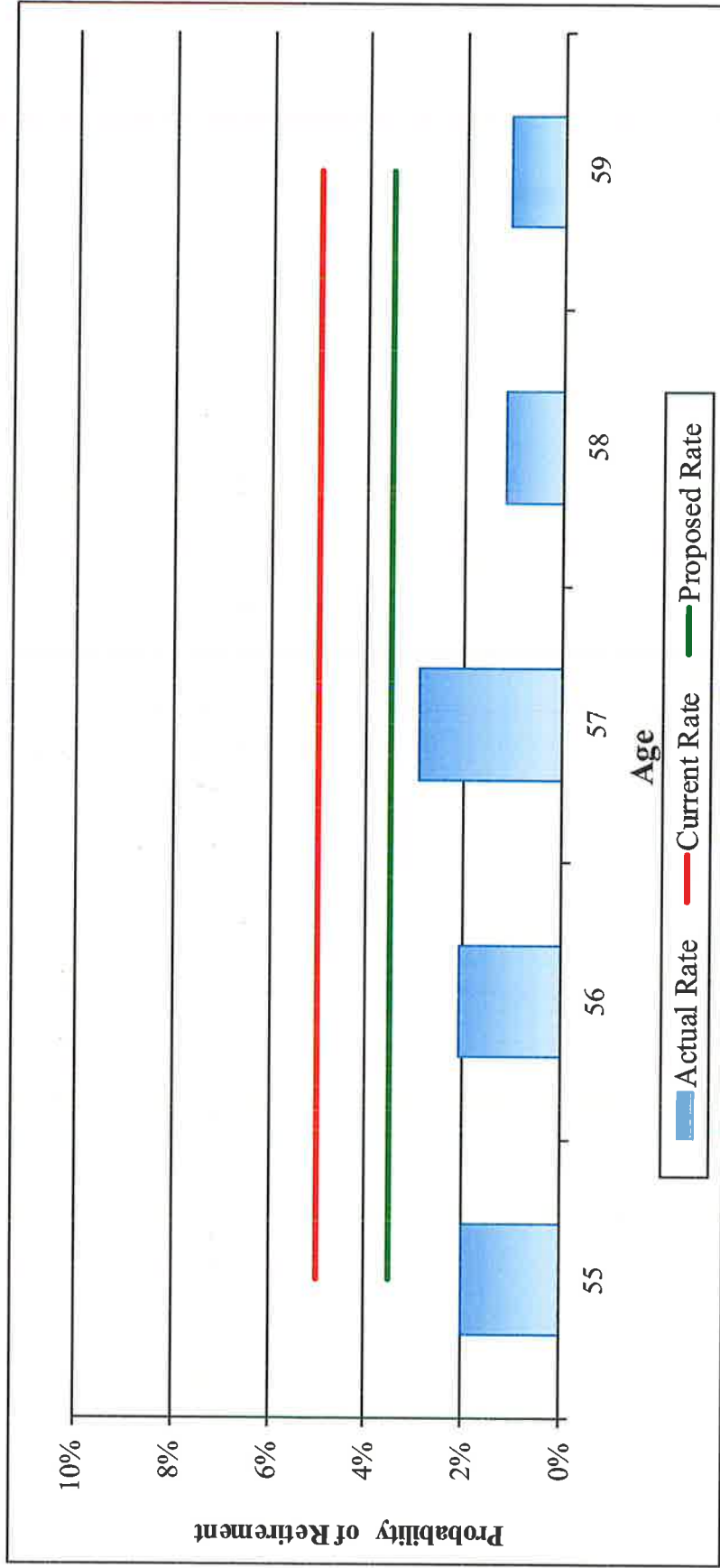
	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual/Expected		39%	56%

EXHIBIT D-4

First Eligible for Unreduced Retirement (Select)
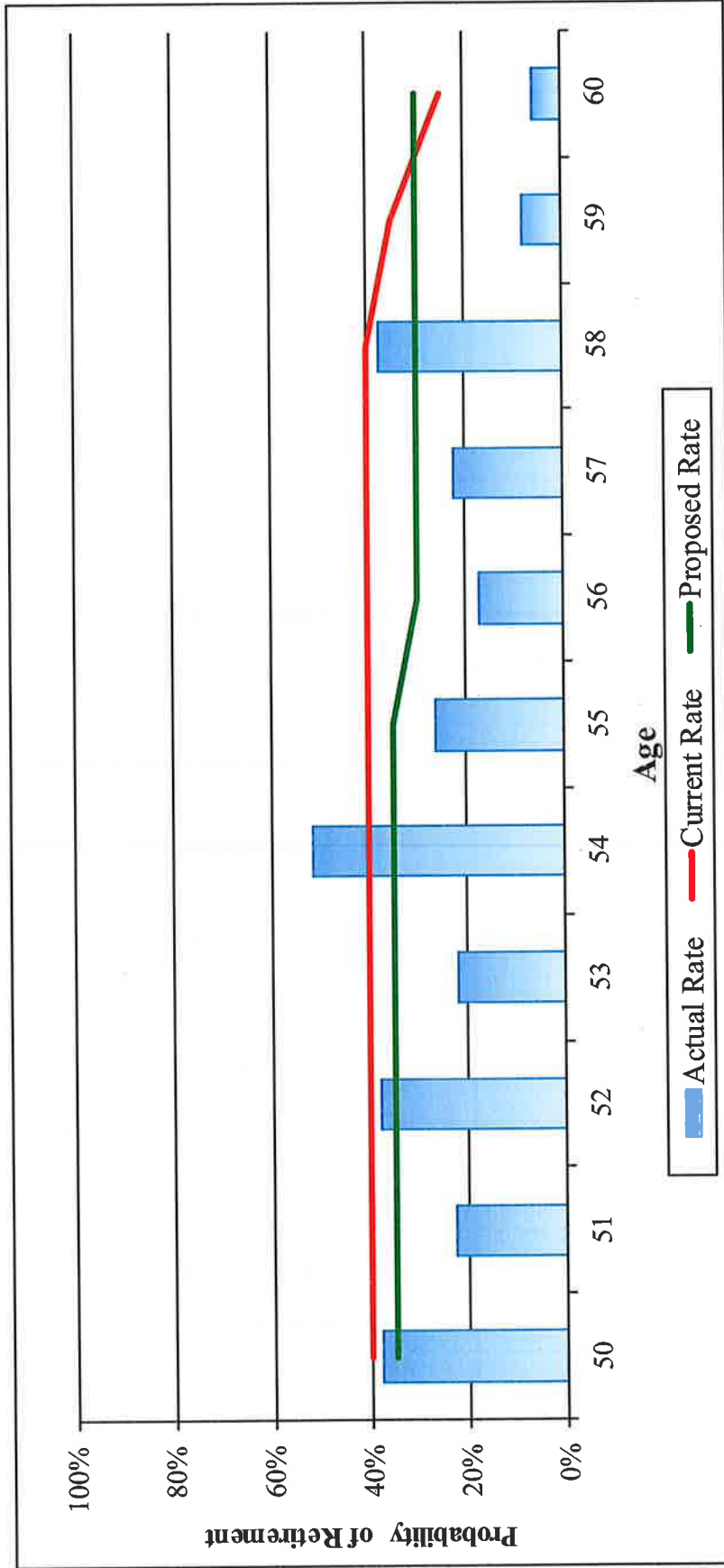
	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual/Expected		60%	68%

EXHIBIT D-5

After First Eligible for Unreduced Retirement (Ultimate)
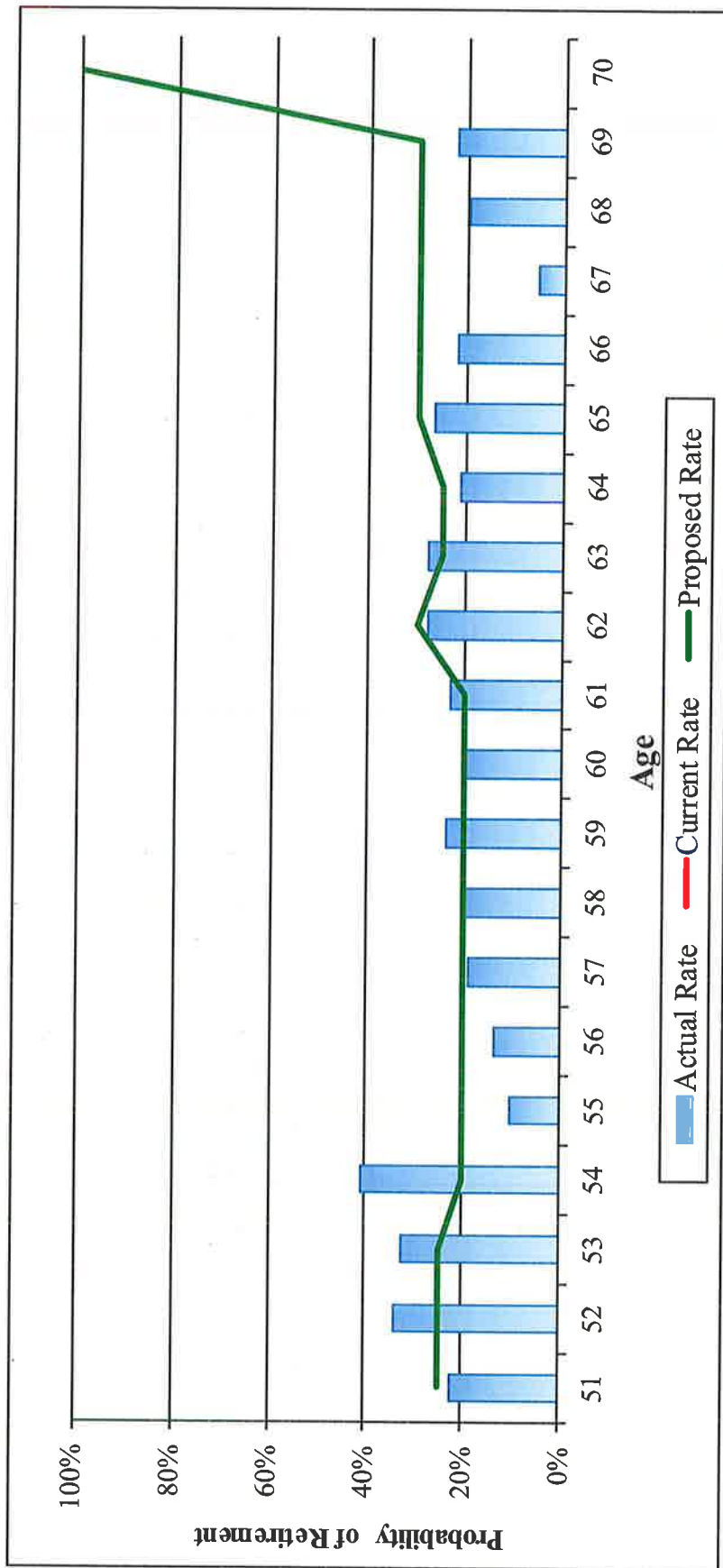
	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual		
Actual/Expected	96%	96%

EXHIBIT D-6

Termination of Employment - Males
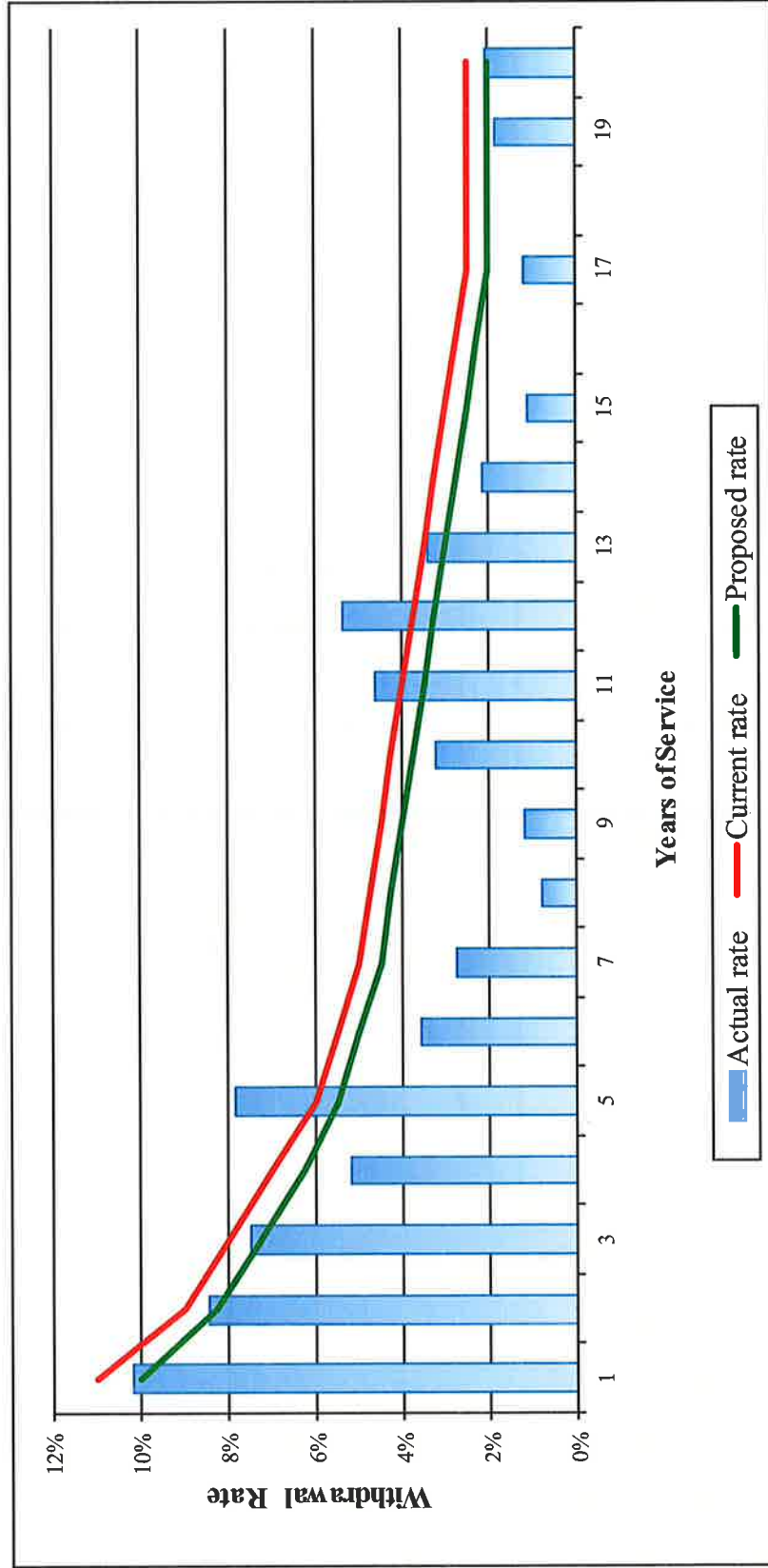
	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual		
Actual/Expected	69%	79%

EXHIBIT D-7
Termination of Employment - Females
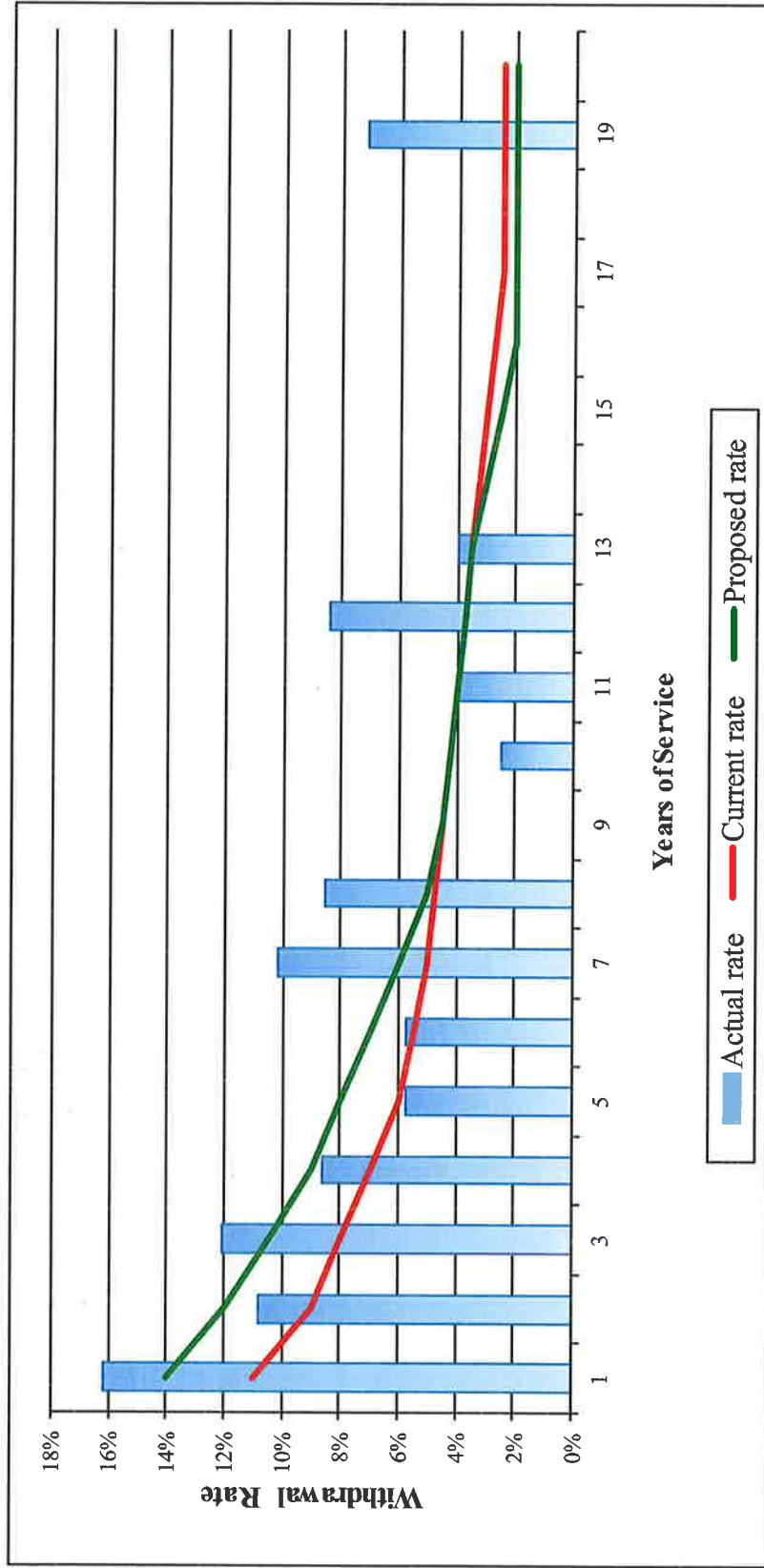
	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual		
Actual/Expected	110%	99%

EXHIBIT D-8

Withdrawal of Employee Contributions
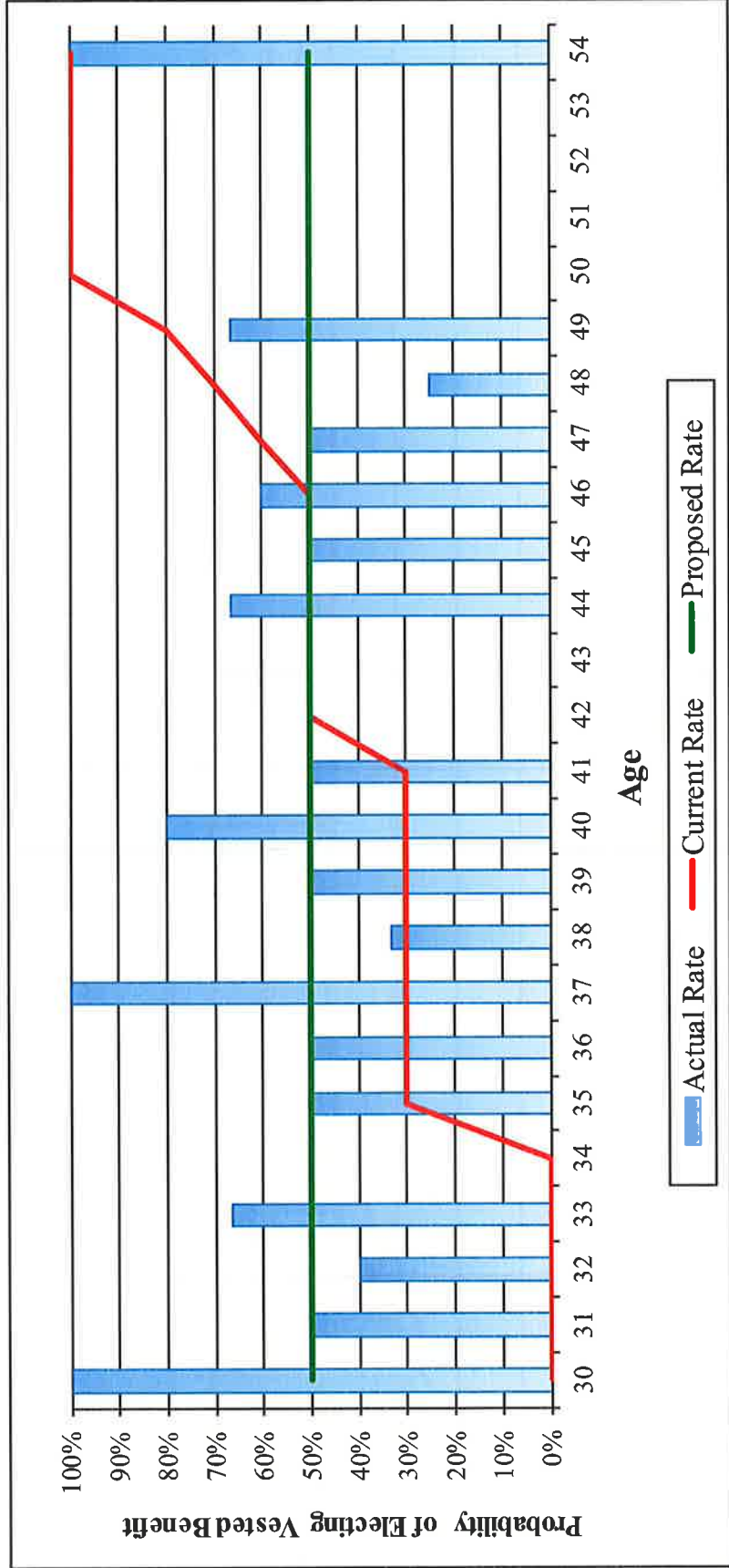
	Expected - Current Assumptions	Expected - Proposed Assumptions
Actual		
Actual/Expected	132%	104%

EXHIBIT D-9
Salary Increases
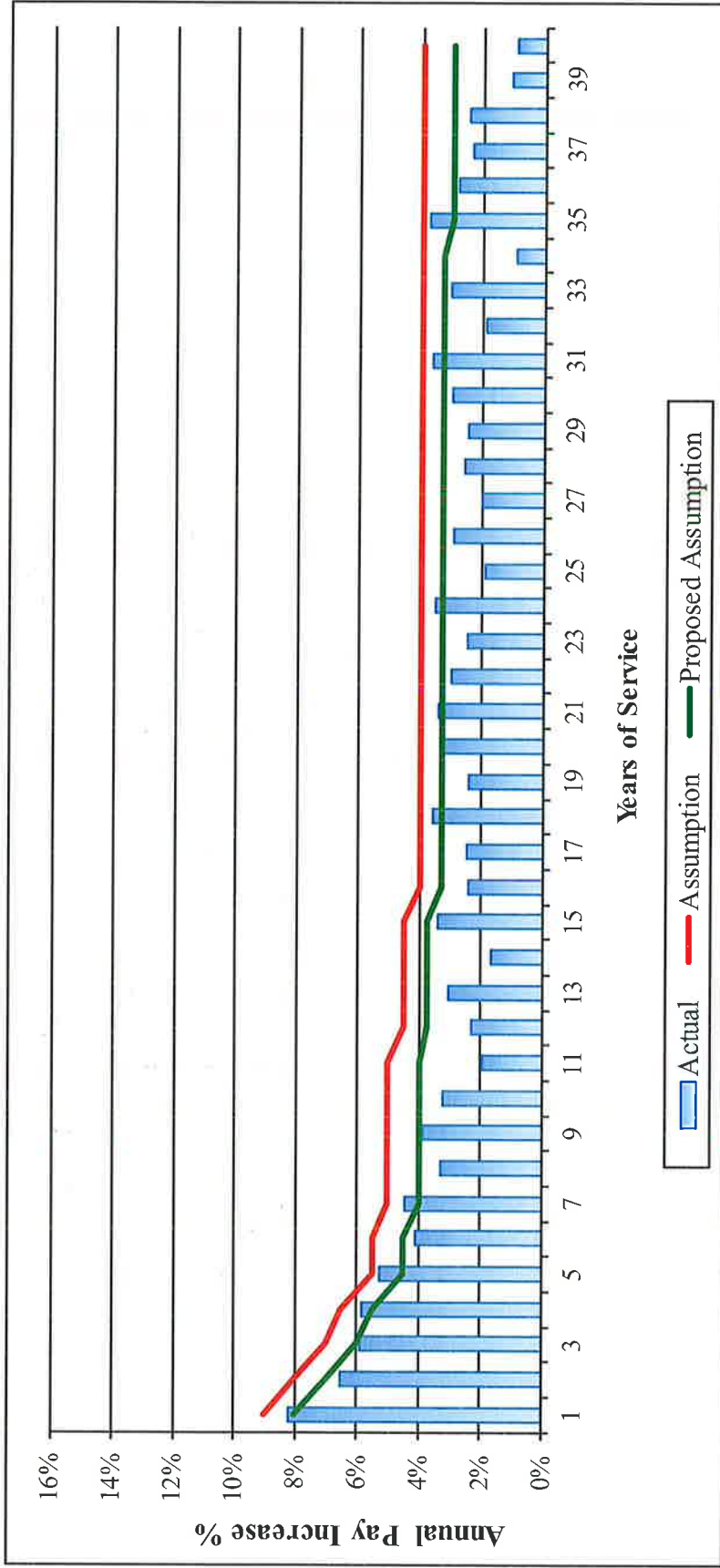
	Actual		Expected - Current Assumptions	Expected - Proposed Assumptions
Average Increase	4.42%		5.43%	4.54%
Actual/Expected			81%	97%

EXHIBIT E-1
Retiree Mortality - Males

Age	Exposure	Actual Deaths	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	52	-	0.000%	0.3	0.484%	0.3	0.589%
56	78	-	0.000%	0.4	0.516%	0.5	0.618%
57	101	2	1.860%	0.6	0.559%	0.7	0.651%
58	159	0	0.246%	1.0	0.607%	1.1	0.691%
59	231	2	0.724%	1.5	0.665%	1.7	0.738%
60	296	5	1.609%	2.2	0.740%	2.3	0.793%
61	316	4	1.300%	2.6	0.815%	2.7	0.857%
62	353	-	0.000%	3.2	0.912%	3.3	0.931%
63	352	-	0.000%	3.6	1.009%	3.6	1.016%
64	389	5	1.332%	4.3	1.117%	4.3	1.112%
65	467	3	0.632%	5.9	1.254%	5.7	1.219%
66	411	7	1.752%	5.7	1.389%	5.5	1.338%
67	351	2	0.446%	5.3	1.515%	5.2	1.470%
68	292	3	0.893%	4.9	1.674%	4.7	1.616%
69	192	6	3.174%	3.5	1.824%	3.4	1.779%
70	197	11	5.609%	4.0	2.019%	3.9	1.959%
71	189	10	5.232%	4.2	2.241%	4.1	2.158%
72	158	10	6.173%	3.9	2.497%	3.8	2.379%
73	146	6	4.185%	4.1	2.785%	3.8	2.624%
74	125	1	1.108%	3.9	3.150%	3.6	2.896%
75	111	1	1.044%	3.9	3.511%	3.6	3.197%
76	93	3	2.766%	3.7	3.957%	3.3	3.532%
77	85	-	0.000%	3.8	4.455%	3.3	3.906%
78	82	1	1.541%	4.1	5.017%	3.6	4.324%
79	63	1	1.047%	3.6	5.648%	3.0	4.789%
80	66	6	8.509%	4.2	6.405%	3.5	5.313%
81	62	3	4.296%	4.5	7.251%	3.6	5.898%
82	55	5	9.668%	4.4	8.082%	3.6	6.556%
83	60	2	3.156%	5.4	9.107%	4.4	7.295%
84	49	1	1.583%	4.9	10.109%	4.0	8.126%
85	40	1	2.253%	4.5	11.208%	3.6	9.054%
86	40	9	22.380%	5.1	12.581%	4.1	10.098%
87	29	4	13.296%	4.1	14.109%	3.3	11.255%
88	25	-	0.000%	3.8	15.592%	3.1	12.547%
89	23	1	3.452%	4.0	17.410%	3.2	13.978%
90	19	-	0.000%	3.6	18.963%	2.9	15.559%
	5,758	113	1.964%	132.7	2.304%	120.1	2.086%

EXHIBIT E-2
Retiree Mortality - Females

Age	Exposure	Actual Deaths	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	55	-	0.000%	0.2	0.363%	0.2	0.363%
56	61	-	0.000%	0.2	0.411%	0.2	0.393%
57	72	-	0.000%	0.3	0.461%	0.3	0.428%
58	85	-	0.000%	0.4	0.518%	0.4	0.470%
59	123	-	0.000%	0.7	0.581%	0.6	0.519%
60	121	-	0.000%	0.8	0.648%	0.7	0.574%
61	116	3	2.387%	0.8	0.720%	0.7	0.635%
62	139	2	1.379%	1.1	0.797%	1.0	0.703%
63	140	0	0.233%	1.2	0.880%	1.1	0.777%
64	142	0	0.263%	1.4	0.971%	1.2	0.856%
65	166	-	0.000%	1.8	1.069%	1.6	0.942%
66	154	4	2.319%	1.8	1.175%	1.6	1.036%
67	120	-	0.000%	1.6	1.290%	1.4	1.138%
68	98	-	0.000%	1.4	1.420%	1.2	1.251%
69	51	-	0.000%	0.8	1.569%	0.7	1.374%
70	64	1	1.584%	1.1	1.718%	1.0	1.509%
71	60	-	0.000%	1.2	1.911%	1.0	1.658%
72	54	-	0.000%	1.1	2.097%	1.0	1.821%
73	51	1	1.433%	1.2	2.324%	1.0	2.001%
74	27	-	0.000%	0.7	2.532%	0.6	2.200%
75	29	0	0.655%	0.8	2.790%	0.7	2.419%
76	34	-	0.000%	1.1	3.113%	0.9	2.664%
77	31	4	12.225%	1.1	3.431%	0.9	2.939%
78	23	2	6.578%	0.9	3.788%	0.7	3.249%
79	20	1	5.742%	0.9	4.187%	0.7	3.601%
80	12	-	0.000%	0.5	4.635%	0.5	4.001%
81	16	1	5.470%	0.8	5.138%	0.7	4.459%
82	19	1	3.756%	1.1	5.705%	0.9	4.979%
83	15	3	20.119%	0.9	6.345%	0.8	5.572%
84	14	0	3.461%	1.0	7.162%	0.9	6.248%
85	10	-	0.000%	0.8	8.093%	0.7	7.010%
86	8	3	31.786%	0.7	9.145%	0.6	7.874%
87	6	-	0.000%	0.6	10.186%	0.5	8.835%
88	4	0	9.245%	0.5	11.459%	0.4	9.908%
89	6	-	0.000%	0.8	12.664%	0.7	11.092%
90	7	-	0.000%	1.0	13.906%	0.9	12.404%
	2,154	25	1.179%	33.3	1.547%	29.2	1.356%

EXHIBIT E-3
Early Retirement

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	91	2	2.198%	4.6	5.000%	3.2	3.500%
56	93	2	2.151%	4.7	5.000%	3.3	3.500%
57	107	3	2.804%	5.4	5.000%	3.7	3.500%
58	105	2	1.905%	5.3	5.000%	3.7	3.500%
59	36	1	2.778%	1.8	5.000%	1.3	3.500%
	432	10	2.315%	21.6	5.000%	15.1	3.500%

EXHIBIT E-4
First Eligible for Unreduced Retirement (Select)

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
50	14	5	37.933%	5.4	40.000%	4.7	35.000%
51	14	3	22.630%	5.7	40.000%	4.9	35.000%
52	7	3	37.801%	2.8	40.000%	2.5	35.000%
53	13	3	21.933%	5.2	40.000%	4.6	35.000%
54	16	8	51.616%	6.4	40.000%	5.6	35.000%
55	22	6	26.392%	9.0	40.000%	7.9	35.000%
56	12	2	17.139%	4.8	40.000%	3.6	30.000%
57	13	3	22.320%	5.4	40.000%	4.0	30.000%
58	13	5	37.696%	5.2	40.000%	3.9	30.000%
59	48	4	8.055%	16.9	35.000%	14.5	30.000%
60	24	1	6.069%	6.1	25.000%	7.3	30.000%
	197	43	21.991%	72.9	36.931%	63.5	32.188%

EXHIBIT E-5
After First Eligible for Unreduced Retirement (Ultimate)

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
51	10	2	22.348%	2.5	25.000%	2.5	25.000%
52	28	10	34.106%	7.0	25.000%	7.0	25.000%
53	26	8	32.586%	6.4	25.000%	6.4	25.000%
54	27	11	40.791%	5.3	20.000%	5.3	20.000%
55	21	2	10.431%	4.1	20.000%	4.1	20.000%
56	39	5	13.688%	7.8	20.000%	7.8	20.000%
57	45	9	19.222%	9.0	20.000%	9.0	20.000%
58	48	10	20.623%	9.6	20.000%	9.6	20.000%
59	62	15	23.604%	12.4	20.000%	12.4	20.000%
60	99	20	20.552%	19.9	20.000%	19.9	20.000%
61	99	23	23.059%	19.9	20.000%	19.9	20.000%
62	70	19	27.656%	21.1	30.000%	21.1	30.000%
63	56	15	27.723%	14.0	25.000%	14.0	25.000%
64	46	10	21.249%	11.4	25.000%	11.4	25.000%
65	46	12	26.684%	13.9	30.000%	13.9	30.000%
66	27	6	21.901%	8.2	30.000%	8.2	30.000%
67	15	1	5.668%	4.5	30.000%	4.5	30.000%
68	15	3	19.702%	4.4	30.000%	4.4	30.000%
69	11	2	22.374%	3.4	30.000%	3.4	30.000%
70	8	-	0.000%	7.8	100.000%	7.8	100.000%
	798	184	23.088%	192.6	24.135%	192.6	24.135%

EXHIBIT E-6
Termination of Employment - Males

Duration	Exposure	Actual Terminations	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
1	10	1	10.200%	1.1	11.000%	1.0	10.000%
2	19	2	8.448%	1.7	9.000%	1.6	8.250%
3	26	2	7.504%	2.1	8.000%	1.9	7.250%
4	36	2	5.172%	2.5	7.000%	2.3	6.250%
5	35	3	7.825%	2.1	6.000%	1.9	5.500%
6	46	2	3.578%	2.5	5.500%	2.3	5.000%
7	54	1	2.742%	2.7	5.000%	2.4	4.500%
8	43	0	0.782%	2.0	4.750%	1.8	4.250%
9	36	0	1.194%	1.6	4.500%	1.5	4.000%
10	28	1	3.224%	1.2	4.250%	1.1	3.750%
11	30	1	4.605%	1.2	4.000%	1.0	3.500%
12	43	2	5.371%	1.6	3.750%	1.4	3.250%
13	52	2	3.388%	1.8	3.500%	1.6	3.000%
14	60	1	2.134%	1.9	3.250%	1.6	2.750%
15	58	1	1.104%	1.7	3.000%	1.5	2.500%
16	59	-	0.000%	1.6	2.750%	1.3	2.250%
17	54	1	1.173%	1.4	2.500%	1.1	2.000%
18	49	-	0.000%	1.2	2.500%	1.0	2.000%
19	44	1	1.827%	1.1	2.500%	0.9	2.000%
20	37	1	2.060%	0.9	2.500%	0.7	2.000%
	819	24	2.877%	34.2	4.172%	29.8	3.641%

EXHIBIT E-7
Termination of Employment - Females

Duration	Exposure	Actual Terminations	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
1	5	1	16.178%	0.5	11.000%	0.7	14.000%
2	9	1	10.853%	0.8	9.000%	1.1	12.000%
3	14	2	12.057%	1.1	8.000%	1.4	10.500%
4	17	1	8.631%	1.2	7.000%	1.5	9.000%
5	13	1	5.738%	0.8	6.000%	1.0	8.000%
6	18	1	5.768%	1.0	5.500%	1.2	7.000%
7	19	2	10.178%	0.9	5.000%	1.1	6.000%
8	19	2	8.553%	0.9	4.750%	0.9	5.000%
9	16	-	0.000%	0.7	4.500%	0.7	4.500%
10	16	0	2.484%	0.7	4.250%	0.7	4.250%
11	13	1	3.976%	0.5	4.000%	0.5	4.000%
12	14	1	8.421%	0.5	3.750%	0.5	3.750%
13	14	1	3.956%	0.5	3.500%	0.5	3.500%
14	10	-	0.000%	0.3	3.250%	0.3	3.000%
15	11	-	0.000%	0.3	3.000%	0.3	2.500%
16	14	-	0.000%	0.4	2.750%	0.3	2.000%
17	13	-	0.000%	0.3	2.500%	0.3	2.000%
18	9	-	0.000%	0.2	2.500%	0.2	2.000%
19	10	1	7.186%	0.2	2.500%	0.2	2.000%
20	12	-	0.000%	0.3	2.500%	0.2	2.000%
	264	14	5.125%	12.3	4.650%	13.7	5.203%

EXHIBIT E-8
Withdrawal of Employee Contributions

Age	Terminations	Actual Remaining	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
30	94	94	100.0%	-	0.0%	47.0	50.0%
31	72	34	47.3%	-	0.0%	35.9	50.0%
32	223	97	43.6%	-	0.0%	111.5	50.0%
33	124	88	71.1%	-	0.0%	62.1	50.0%
34	56	-	0.0%	-	0.0%	27.9	50.0%
35	75	42	55.8%	22.6	30.0%	37.6	50.0%
36	127	51	40.3%	38.1	30.0%	63.5	50.0%
37	41	41	100.0%	12.4	30.0%	20.6	50.0%
38	127	43	33.8%	38.0	30.0%	63.3	50.0%
39	91	55	60.9%	27.2	30.0%	45.4	50.0%
40	341	244	71.7%	102.2	30.0%	170.3	50.0%
41	80	35	43.6%	24.0	30.0%	40.0	50.0%
42	-	-	0.0%	-	50.0%	-	50.0%
43	40	-	0.0%	20.0	50.0%	20.0	50.0%
44	124	86	69.1%	62.1	50.0%	62.1	50.0%
45	91	50	54.5%	45.7	50.0%	45.7	50.0%
46	244	167	68.4%	122.2	50.0%	122.2	50.0%
47	182	102	55.9%	109.1	60.0%	90.9	50.0%
48	278	51	18.4%	194.4	70.0%	138.9	50.0%
49	150	102	68.2%	120.3	80.0%	75.2	50.0%
50	54	-	0.0%	54.0	100.0%	27.0	50.0%
51	43	-	0.0%	43.3	100.0%	21.7	50.0%
52	-	-	0.0%	-	100.0%	-	50.0%
53	50	-	0.0%	49.5	100.0%	24.8	50.0%
54	38	38	100.0%	38.1	100.0%	19.0	50.0%
	2,745	1,421	51.8%	1,123.2	40.9%	1,372.5	50.0%

EXHIBIT E-9
Salary Increases

Duration	Initial Salary (Millions)	Subsequent Salary (Millions)	Actual Rate	Current Expected (Millions)	Current Rate	Proposed Expected (Millions)	Proposed Rate
1	13.3	14.4	8.2%	14.4	8.2%	14.4	8.0%
2	12.9	13.8	6.5%	13.8	6.5%	13.8	7.0%
3	12.1	12.8	5.9%	12.8	5.9%	12.8	6.0%
4	13.5	14.3	5.8%	14.3	5.8%	14.2	5.5%
5	12.1	12.7	5.2%	12.7	5.2%	12.6	4.5%
6	13.6	14.1	4.1%	14.1	4.1%	14.2	4.5%
7	13.1	13.7	4.4%	13.7	4.4%	13.6	4.0%
8	10.1	10.4	3.3%	10.4	3.3%	10.5	4.0%
9	8.2	8.5	3.8%	8.5	3.8%	8.5	4.0%
10	6.2	6.4	3.2%	6.4	3.2%	6.4	4.0%
11	5.1	5.2	2.0%	5.2	2.0%	5.3	4.0%
12	6.1	6.2	2.3%	6.2	2.3%	6.3	3.8%
13	7.1	7.3	3.0%	7.3	3.0%	7.3	3.8%
14	7.3	7.4	1.7%	7.4	1.7%	7.6	3.8%
15	7.0	7.2	3.4%	7.2	3.4%	7.3	3.8%
16	7.3	7.4	2.4%	7.4	2.4%	7.5	3.3%
17	7.0	7.2	2.5%	7.2	2.5%	7.2	3.3%
18	6.3	6.5	3.6%	6.5	3.6%	6.5	3.3%
19	5.7	5.9	2.4%	5.9	2.4%	5.9	3.3%
20	5.2	5.4	3.3%	5.4	3.3%	5.4	3.3%
21	4.6	4.7	3.4%	4.7	3.4%	4.7	3.3%
22	5.1	5.2	3.0%	5.2	3.0%	5.2	3.3%
23	4.7	4.8	2.5%	4.8	2.5%	4.9	3.3%
24	4.3	4.4	3.5%	4.4	3.5%	4.4	3.3%
25	3.2	3.3	1.9%	3.3	1.9%	3.3	3.3%
26	2.2	2.3	2.9%	2.3	2.9%	2.3	3.3%
27	1.8	1.9	2.0%	1.9	2.0%	1.9	3.3%
28	1.9	2.0	2.6%	2.0	2.6%	2.0	3.3%
29	1.9	1.9	2.5%	1.9	2.5%	2.0	3.3%
30	1.5	1.5	3.0%	1.5	3.0%	1.5	3.3%
31	1.0	1.0	3.6%	1.0	3.6%	1.0	3.3%
32	0.9	0.9	1.9%	0.9	1.9%	0.9	3.3%
33	0.5	0.5	3.0%	0.5	3.0%	0.5	3.3%
34	0.3	0.3	0.9%	0.3	0.9%	0.3	3.3%
35	0.2	0.3	3.7%	0.3	3.7%	0.3	3.0%
36	0.1	0.1	2.8%	0.1	2.8%	0.1	3.0%
37	0.3	0.3	2.4%	0.3	2.4%	0.3	3.0%
38	0.3	0.3	2.4%	0.3	2.4%	0.3	3.0%
39	0.3	0.3	1.1%	0.3	1.1%	0.3	3.0%
40	0.1	0.1	0.9%	0.1	0.9%	0.1	3.0%
	214.2	223.0	4.1%	223.0	4.1%	223.7	4.4%

EXHIBIT F-1
Retiree Mortality - Males

Age	Exposure	Actual Deaths	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	17	-	0.000%	0.1	0.484%	0.1	0.589%
56	28	-	0.000%	0.1	0.516%	0.2	0.618%
57	36	1	2.778%	0.2	0.559%	0.2	0.651%
58	55	1	1.818%	0.3	0.607%	0.4	0.691%
59	77	1	1.299%	0.5	0.665%	0.6	0.738%
60	107	1	0.935%	0.8	0.740%	0.8	0.793%
61	120	2	1.667%	1.0	0.815%	1.0	0.857%
62	142	-	0.000%	1.3	0.912%	1.3	0.931%
63	147	-	0.000%	1.5	1.009%	1.5	1.016%
64	165	3	1.818%	1.8	1.117%	1.8	1.112%
65	189	1	0.529%	2.4	1.254%	2.3	1.219%
66	165	4	2.424%	2.3	1.389%	2.2	1.338%
67	141	2	1.418%	2.1	1.515%	2.1	1.470%
68	118	1	0.847%	2.0	1.674%	1.9	1.616%
69	94	4	4.255%	1.7	1.824%	1.7	1.779%
70	98	4	4.082%	2.0	2.019%	1.9	1.959%
71	97	3	3.093%	2.2	2.241%	2.1	2.158%
72	88	5	5.682%	2.2	2.497%	2.1	2.379%
73	78	4	5.128%	2.2	2.785%	2.0	2.624%
74	67	1	1.493%	2.1	3.150%	1.9	2.896%
75	66	1	1.515%	2.3	3.511%	2.1	3.197%
76	54	2	3.704%	2.1	3.957%	1.9	3.532%
77	51	-	0.000%	2.3	4.455%	2.0	3.906%
78	52	1	1.923%	2.6	5.017%	2.2	4.324%
79	39	1	2.564%	2.2	5.648%	1.9	4.789%
80	38	3	7.895%	2.4	6.405%	2.0	5.313%
81	36	2	5.556%	2.6	7.251%	2.1	5.898%
82	33	4	12.121%	2.7	8.082%	2.2	6.556%
83	36	2	5.556%	3.3	9.107%	2.6	7.295%
84	30	1	3.333%	3.0	10.109%	2.4	8.126%
85	27	1	3.704%	3.0	11.208%	2.4	9.054%
86	26	5	19.231%	3.3	12.581%	2.6	10.098%
87	20	5	25.000%	2.8	14.109%	2.3	11.255%
88	15	-	0.000%	2.3	15.592%	1.9	12.547%
89	14	1	7.143%	2.4	17.410%	2.0	13.978%
90	13	-	0.000%	2.5	18.963%	2.0	15.559%
	2,579	67	2.598%	70.7	2.742%	62.9	2.440%

EXHIBIT F-2
Retiree Mortality - Females

Age	Exposure	Actual Deaths	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	21	-	0.000%	0.1	0.363%	0.1	0.363%
56	23	-	0.000%	0.1	0.411%	0.1	0.393%
57	27	-	0.000%	0.1	0.461%	0.1	0.428%
58	34	-	0.000%	0.2	0.518%	0.2	0.470%
59	48	-	0.000%	0.3	0.581%	0.2	0.519%
60	54	-	0.000%	0.4	0.648%	0.3	0.574%
61	55	1	1.818%	0.4	0.720%	0.3	0.635%
62	68	2	2.941%	0.5	0.797%	0.5	0.703%
63	68	1	1.471%	0.6	0.880%	0.5	0.777%
64	73	1	1.370%	0.7	0.971%	0.6	0.856%
65	85	-	0.000%	0.9	1.069%	0.8	0.942%
66	77	2	2.597%	0.9	1.175%	0.8	1.036%
67	66	-	0.000%	0.9	1.290%	0.8	1.138%
68	54	-	0.000%	0.8	1.420%	0.7	1.251%
69	32	-	0.000%	0.5	1.569%	0.4	1.374%
70	38	1	2.632%	0.7	1.718%	0.6	1.509%
71	37	-	0.000%	0.7	1.911%	0.6	1.658%
72	35	-	0.000%	0.7	2.097%	0.6	1.821%
73	36	1	2.778%	0.8	2.324%	0.7	2.001%
74	27	-	0.000%	0.7	2.532%	0.6	2.200%
75	23	1	4.348%	0.6	2.790%	0.6	2.419%
76	23	-	0.000%	0.7	3.113%	0.6	2.664%
77	21	1	4.762%	0.7	3.431%	0.6	2.939%
78	16	1	6.250%	0.6	3.788%	0.5	3.249%
79	17	2	11.765%	0.7	4.187%	0.6	3.601%
80	14	-	0.000%	0.6	4.635%	0.6	4.001%
81	18	1	5.556%	0.9	5.138%	0.8	4.459%
82	19	1	5.263%	1.1	5.705%	0.9	4.979%
83	16	3	18.750%	1.0	6.345%	0.9	5.572%
84	13	1	7.692%	0.9	7.162%	0.8	6.248%
85	8	-	0.000%	0.6	8.093%	0.6	7.010%
86	8	1	12.500%	0.7	9.145%	0.6	7.874%
87	7	-	0.000%	0.7	10.186%	0.6	8.835%
88	7	1	14.286%	0.8	11.459%	0.7	9.908%
89	8	-	0.000%	1.0	12.664%	0.9	11.092%
90	8	-	0.000%	1.1	13.906%	1.0	12.404%
	1,184	22	1.858%	23.9	2.020%	20.9	1.765%

EXHIBIT F-3
Early Retirement

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
55	91	2	2.198%	4.6	5.000%	3.2	3.500%
56	93	2	2.151%	4.7	5.000%	3.3	3.500%
57	107	3	2.804%	5.4	5.000%	3.7	3.500%
58	105	2	1.905%	5.3	5.000%	3.7	3.500%
59	36	1	2.778%	1.8	5.000%	1.3	3.500%
	432	10	2.315%	21.6	5.000%	15.1	3.500%

EXHIBIT F-4
First Eligible for Unreduced Retirement (Select)

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
50	8	3	37.500%	3.2	40.000%	2.8	35.000%
51	8	2	25.000%	3.2	40.000%	2.8	35.000%
52	4	2	50.000%	1.6	40.000%	1.4	35.000%
53	8	2	25.000%	3.2	40.000%	2.8	35.000%
54	10	6	60.000%	4.0	40.000%	3.5	35.000%
55	12	4	33.333%	4.8	40.000%	4.2	35.000%
56	7	1	14.286%	2.8	40.000%	2.1	30.000%
57	9	2	22.222%	3.6	40.000%	2.7	30.000%
58	11	4	36.364%	4.4	40.000%	3.3	30.000%
59	68	5	7.353%	23.8	35.000%	20.4	30.000%
60	33	2	6.061%	8.3	25.000%	9.9	30.000%
	178	33	18.539%	62.9	35.309%	55.9	31.404%

EXHIBIT F-5
After First Eligible for Unreduced Retirement (Ultimate)

Age	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
51	6	1	16.667%	1.5	25.000%	1.5	25.000%
52	15	5	33.333%	3.8	25.000%	3.8	25.000%
53	13	4	30.769%	3.3	25.000%	3.3	25.000%
54	14	7	50.000%	2.8	20.000%	2.8	20.000%
55	11	2	18.182%	2.2	20.000%	2.2	20.000%
56	19	2	10.526%	3.8	20.000%	3.8	20.000%
57	22	3	13.636%	4.4	20.000%	4.4	20.000%
58	25	5	20.000%	5.0	20.000%	5.0	20.000%
59	33	9	27.273%	6.6	20.000%	6.6	20.000%
60	84	14	16.667%	16.8	20.000%	16.8	20.000%
61	95	23	24.211%	19.0	20.000%	19.0	20.000%
62	67	13	19.403%	20.1	30.000%	20.1	30.000%
63	55	13	23.636%	13.8	25.000%	13.8	25.000%
64	49	11	22.449%	12.3	25.000%	12.3	25.000%
65	42	8	19.048%	12.6	30.000%	12.6	30.000%
66	28	6	21.429%	8.4	30.000%	8.4	30.000%
67	16	1	6.250%	4.8	30.000%	4.8	30.000%
68	15	2	13.333%	4.5	30.000%	4.5	30.000%
69	12	4	33.333%	3.6	30.000%	3.6	30.000%
70	5	-	0.000%	5.0	100.000%	5.0	100.000%
	626	133	21.246%	154.1	24.617%	154.1	24.617%

EXHIBIT F-6
Termination of Employment - Males

Duration	Exposure	Actual Terminations	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
1	243	23	9.465%	26.7	11.000%	24.3	10.000%
2	210	18	8.571%	18.9	9.000%	17.3	8.250%
3	182	9	4.945%	14.6	8.000%	13.2	7.250%
4	186	7	3.763%	13.0	7.000%	11.6	6.250%
5	141	10	7.092%	8.5	6.000%	7.8	5.500%
6	144	6	4.167%	7.9	5.500%	7.2	5.000%
7	139	4	2.878%	7.0	5.000%	6.3	4.500%
8	93	1	1.075%	4.4	4.750%	4.0	4.250%
9	67	1	1.493%	3.0	4.500%	2.7	4.000%
10	51	2	3.922%	2.2	4.250%	1.9	3.750%
11	50	3	6.000%	2.0	4.000%	1.8	3.500%
12	65	4	6.154%	2.4	3.750%	2.1	3.250%
13	73	2	2.740%	2.6	3.500%	2.2	3.000%
14	77	2	2.597%	2.5	3.250%	2.1	2.750%
15	67	1	1.493%	2.0	3.000%	1.7	2.500%
16	63	-	0.000%	1.7	2.750%	1.4	2.250%
17	56	1	1.786%	1.4	2.500%	1.1	2.000%
18	47	-	0.000%	1.2	2.500%	0.9	2.000%
19	39	1	2.564%	1.0	2.500%	0.8	2.000%
20	31	1	3.226%	0.8	2.500%	0.6	2.000%
	2,024	96	4.743%	123.7	6.112%	110.9	5.480%

EXHIBIT F-7
Termination of Employment - Females

Duration	Exposure	Actual Terminations	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
1	119	18	15.126%	13.1	11.000%	16.7	14.000%
2	102	13	12.745%	9.2	9.000%	12.2	12.000%
3	97	9	9.278%	7.8	8.000%	10.2	10.500%
4	87	7	8.046%	6.1	7.000%	7.8	9.000%
5	52	3	5.769%	3.1	6.000%	4.2	8.000%
6	58	3	5.172%	3.2	5.500%	4.1	7.000%
7	55	6	10.909%	2.8	5.000%	3.3	6.000%
8	44	3	6.818%	2.1	4.750%	2.2	5.000%
9	34	-	0.000%	1.5	4.500%	1.5	4.500%
10	32	1	3.125%	1.4	4.250%	1.4	4.250%
11	24	1	4.167%	1.0	4.000%	1.0	4.000%
12	25	2	8.000%	0.9	3.750%	0.9	3.750%
13	23	1	4.348%	0.8	3.500%	0.8	3.500%
14	15	-	0.000%	0.5	3.250%	0.5	3.000%
15	14	-	0.000%	0.4	3.000%	0.4	2.500%
16	17	-	0.000%	0.5	2.750%	0.3	2.000%
17	14	-	0.000%	0.4	2.500%	0.3	2.000%
18	10	-	0.000%	0.3	2.500%	0.2	2.000%
19	11	1	9.091%	0.3	2.500%	0.2	2.000%
20	11	-	0.000%	0.3	2.500%	0.2	2.000%
	844	68	8.057%	55.4	6.563%	68.3	8.091%

EXHIBIT F-8
Withdrawal of Employee Contributions

Age	Terminations	Actual Remaining	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
30	2	2	100.0%	-	0.0%	1.0	50.0%
31	2	1	50.0%	-	0.0%	1.0	50.0%
32	5	2	40.0%	-	0.0%	2.5	50.0%
33	3	2	66.7%	-	0.0%	1.5	50.0%
34	1	-	0.0%	-	0.0%	0.5	50.0%
35	2	1	50.0%	0.6	30.0%	1.0	50.0%
36	2	1	50.0%	0.6	30.0%	1.0	50.0%
37	1	1	100.0%	0.3	30.0%	0.5	50.0%
38	3	1	33.3%	0.9	30.0%	1.5	50.0%
39	2	1	50.0%	0.6	30.0%	1.0	50.0%
40	5	4	80.0%	1.5	30.0%	2.5	50.0%
41	2	1	50.0%	0.6	30.0%	1.0	50.0%
42	-	-	0.0%	-	50.0%	-	50.0%
43	1	-	0.0%	0.5	50.0%	0.5	50.0%
44	3	2	66.7%	1.5	50.0%	1.5	50.0%
45	2	1	50.0%	1.0	50.0%	1.0	50.0%
46	5	3	60.0%	2.5	50.0%	2.5	50.0%
47	4	2	50.0%	2.4	60.0%	2.0	50.0%
48	4	1	25.0%	2.8	70.0%	2.0	50.0%
49	3	2	66.7%	2.4	80.0%	1.5	50.0%
50	1	-	0.0%	1.0	100.0%	0.5	50.0%
51	1	-	0.0%	1.0	100.0%	0.5	50.0%
52	-	-	0.0%	-	100.0%	-	50.0%
53	1	-	0.0%	1.0	100.0%	0.5	50.0%
54	1	1	100.0%	1.0	100.0%	0.5	50.0%
	56	29	51.8%	22.2	39.6%	28.0	50.0%

EXHIBIT F-9
Salary Increases

Duration	Initial Salary (Millions)	Subsequent Salary (Millions)	Actual Rate	Current Expected (Millions)	Current Rate	Proposed Expected (Millions)	Proposed Rate
1	13.3	14.4	8.2%	14.4	8.2%	14.4	8.0%
2	12.9	13.8	6.5%	13.8	6.5%	13.8	7.0%
3	12.1	12.8	5.9%	12.8	5.9%	12.8	6.0%
4	13.5	14.3	5.8%	14.3	5.8%	14.2	5.5%
5	12.1	12.7	5.2%	12.7	5.2%	12.6	4.5%
6	13.6	14.1	4.1%	14.1	4.1%	14.2	4.5%
7	13.1	13.7	4.4%	13.7	4.4%	13.6	4.0%
8	10.1	10.4	3.3%	10.4	3.3%	10.5	4.0%
9	8.2	8.5	3.8%	8.5	3.8%	8.5	4.0%
10	6.2	6.4	3.2%	6.4	3.2%	6.4	4.0%
11	5.1	5.2	2.0%	5.2	2.0%	5.3	4.0%
12	6.1	6.2	2.3%	6.2	2.3%	6.3	3.8%
13	7.1	7.3	3.0%	7.3	3.0%	7.3	3.8%
14	7.3	7.4	1.7%	7.4	1.7%	7.6	3.8%
15	7.0	7.2	3.4%	7.2	3.4%	7.3	3.8%
16	7.3	7.4	2.4%	7.4	2.4%	7.5	3.3%
17	7.0	7.2	2.5%	7.2	2.5%	7.2	3.3%
18	6.3	6.5	3.6%	6.5	3.6%	6.5	3.3%
19	5.7	5.9	2.4%	5.9	2.4%	5.9	3.3%
20	5.2	5.4	3.3%	5.4	3.3%	5.4	3.3%
21	4.6	4.7	3.4%	4.7	3.4%	4.7	3.3%
22	5.1	5.2	3.0%	5.2	3.0%	5.2	3.3%
23	4.7	4.8	2.5%	4.8	2.5%	4.9	3.3%
24	4.3	4.4	3.5%	4.4	3.5%	4.4	3.3%
25	3.2	3.3	1.9%	3.3	1.9%	3.3	3.3%
26	2.2	2.3	2.9%	2.3	2.9%	2.3	3.3%
27	1.8	1.9	2.0%	1.9	2.0%	1.9	3.3%
28	1.9	2.0	2.6%	2.0	2.6%	2.0	3.3%
29	1.9	1.9	2.5%	1.9	2.5%	2.0	3.3%
30	1.5	1.5	3.0%	1.5	3.0%	1.5	3.3%
31	1.0	1.0	3.6%	1.0	3.6%	1.0	3.3%
32	0.9	0.9	1.9%	0.9	1.9%	0.9	3.3%
33	0.5	0.5	3.0%	0.5	3.0%	0.5	3.3%
34	0.3	0.3	0.9%	0.3	0.9%	0.3	3.3%
35	0.2	0.3	3.7%	0.3	3.7%	0.3	3.0%
36	0.1	0.1	2.8%	0.1	2.8%	0.1	3.0%
37	0.3	0.3	2.4%	0.3	2.4%	0.3	3.0%
38	0.3	0.3	2.4%	0.3	2.4%	0.3	3.0%
39	0.3	0.3	1.1%	0.3	1.1%	0.3	3.0%
40	0.1	0.1	0.9%	0.1	0.9%	0.1	3.0%
	214.2	223.0	4.1%	223.0	4.1%	223.7	4.4%

Appendix E

Omaha Police and Fire
Retirement Plan Information

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Finance Department

Omaha/Douglas Civic Center
1819 Farnam Street, Suite 1004
Omaha, Nebraska 68183-1004
(402) 444-5416
Telefax (402) 546-1150

Stephen B. Curtiss
Finance Director

Allen Herink
City Comptroller

City of Omaha
Jean Stothert, Mayor

October 15, 2018

Senator Mark Kolterman, Chairperson
Nebraska Retirement Systems Committee
PO BOX 94604
State Capitol
Lincoln, NE 68509-4604

Dear Senator Kolterman:

Neb. Rev. Stat § 13-2402(3) requires a governing entity that offers a defined benefit retirement plan to file a report if the funded ratio is less than eighty percent. The City of Omaha is submitting this report regarding the City of Omaha Police & Fire Retirement System (COPFRS) because the funded ratio is less than eighty percent.

The City through its negotiations with the public safety bargaining agents has made efforts to address the funding shortfall in COPFRS. Some of those efforts are addressed below. The attached table compares the actuarial data for plan years 2013 through current plan year 2018. Since the Actuarial Report for January 1, 2018 is not yet complete, there are several items that are not current for 2018. We anticipate that Report will be presented and accepted in October or November of 2018 and when it is, we will provide a copy to you and update the attached table.

In 2015, the Actuarial Committee elected to change the valuation methodology for the members who are currently participating or are expected to participate in the Deferred Retirement Option Plan (DROP) in the future. Under the methodology, the Entry Age Normal Cost calculation spreads the cost of benefits over the member's entire career. As part of the change in methodology, certain actuarial assumptions related to the DROP were developed. These include the percentage of eligible members assumed to elect to participate in the DROP, the DROP period, and the interest rate assumed to be credited to the DROP account.

An experience study for 2012-2015 was completed and presented to the Board in March, 2018. The Experience Study suggested a number of assumption changes which the Board accepted and agreed to at the August 16, 2018 meeting. The following changes were made to the economic assumptions which changes were made in the January 1, 2018 actuarial valuation:

	Current	Recommended
Price inflation	3.25%	2.50%
Investment return	8.00%	7.75%
General wage growth	4.00%	3.25%
Payroll growth	4.00%	3.25%

In addition, there were some changes to Demographic Assumptions which are also described in the Experience Study that is attached to this report.

There are numerous circumstances that led to the current underfunding. When the system was fully funded in the late 1990s, benefits were increased and even though the actuarial cost was calculated, the benefits appear to have exceeded those costs. There also have been some years where the investment loss was historically large. During the economic downturn of early 2000s, there were some additional benefits (compensatory time paid at end of career) negotiated as part of wage and other compensation deferments. It was anticipated that people would take advantage of the additional time off, but many did not, resulting in an increase in the compensation amount upon which the pension was calculated. Another factor has been that wages have not increased at the rate in the actuarial assumptions.

Significant efforts were made to address the funding status of COPFRS starting in 2008. In 2008, then Mayor Mike Fahey established the Bates Commission to examine the issue. The Bates Commission, made up of business leaders, union leaders, and City leaders, made a number of recommendations in their final report. The report was the impetus for collaborative efforts between the City and its unions to address the funding issue in labor negotiations. In an effort to improve the funding status, the City increased contributions and modified pension benefits through labor agreements with the police union in October, 2010 and with the fire union in December, 2012. The changes in contributions and benefits included:

- Changing minimum retirement age from 45 to 50
- Requiring 30 years of service instead of 25 years to get the maximum benefit
- Implementing a Career Overtime Average (COTA) so that employees could not artificially enhance their pension by working a lot of overtime or selling comp time in their last year of employment
- Smoothing the salary on which a pension calculation was based from highest 1 year to highest 3 years
- Pensions for new hires was based only on base salary
- For all groups excluding the police union, capping pension for new hires at 65% and requiring 30 years of service
- Increased City contributions to the system by 13% to 14%

The employees who are part of the COPFRS are from four (4) bargaining groups. Three of those bargaining groups have had collective bargaining agreements in place through the end of 2018 for several years. The fourth group, the Omaha Police Officers Association entered into a collective bargaining agreement for 2015 through 2020 which agreement was effective in March, 2017. As part of that collective bargaining agreement, the City and the employees have agreed to contribute an additional 0.75% of wages into the system for 2018 to 2020. There was also a change to the widow's pension provision to provide that a widow's pension is only payable if the officer and spouse were married as of the date of the officer's retirement. Negotiations with Police Management for 2019 and beyond have concluded and there were no additional pension contributions. Negotiations with the other two bargaining groups are expected to commence in the near future.

The Trustees of the System and the City believe some of the changes described above are starting to see a positive effect. As of January 1, 2017, the system had market assets of approximately $636.4 million and a funded ratio of 52%. The system had a funded ratio of 51% in 2016. Though the funded ratio decreased in 2015 due to poor investment results, the actuarial value of assets increased $30 million. The System had a funded ratio of 49% in 2014 and 44% in 2013. The actuarial contribution rate needed for the system on 1/1/2017 was 50.212% and the total amount being contributed was 50.509% demonstrating that the amount being put in is sufficient for the second consecutive year. The unfunded actuarial liability is amortized, as a level percentage of payroll, over a closed 30-year period that began on January 1, 2014.

The most recent projection had the system fully funded in 2046. A copy of that projection is attached for your convenience.

As requested, we enclose the most recent Actuarial Experience Study which was submitted in March, 2018 and the most recent Actuarial Valuation Report which was presented to the Board in November, 2017.   The System's actuary is in the process of finalizing the Actuarial Valuation Report effective January 1, 2018. We would anticipate approval by the Board on October 18, 2018 and we will provide that report to you as soon as possible after approval.

If you or the Committee should have any questions regarding this report please let me know.

Sincerely,

Stephen B. Curtiss
Finance Director

COPFRS EXHIBIT 1

ITEM	2013	2014	2015	2016	2017	2018
Funding Status	45%	47%	50%	51%	52%	52%
Assumed Rate of Return	8%	8%	8%	8%	8%	7.75%
Actual Return	18.5%	4.9%	0.7%	9.1%	15.0%	Pending*
Net Assets (actuarial value)	$495,847,234	$548,360,223	$590,191,585	$621,403,975	$656,171,797	$706,595,615
Unfunded Actuarial Accrued Liability	$613,027,544	$622,607,530	$598,810,636	$602,562,135	$611,737,378	$648,833,922
Normal Cost ($)	$26,403,410	$27,285,957	$26,946,719	$27,426,921	$27,892,194	$28,859,311
Normal Cost (%)	23.525%	23.102%	22.191%	22.146%	21.991%	22.211%
Member Contribution Rate	15.35%-17.15%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%
Employer Contribution Rate	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%
Actuarial Required Contribution	$54,310,693	$52,895,180	$43,524,890	$41,910,737	$42,468,180	$45,939,660
Blended Combined Contribution Rate	63.416%	53.208%	50.581%	50.543%	50.509%	51.287%
Actuarial Rate of Contribution (ARC)	62.272%	52.138%	50.013%	50.097%	50.212%	53.199%
Contribution Margin	-11.067%	-53.138%	0.550%	0.446%	0.297%	-1.912%
Employer Actual Dollars Contributed	$35,302,037	$43,838,750	$41,851,986	$42,138,403	$43,235,242	$46,608,741
% of ARC by Employer Contribution	82.88%	96.16%	100.54%	101.81%	101.46%	Pending*

Pending* Info will be available at year end

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

October 2, 2018

Mr. Allen Herink
City of Omaha
1819 Farnam Street
Omaha, NE 68183

Re: Projections of Long Term Funding for City of Omaha Police and Fire Retirement System

Dear Al:

At your request, we have completed an actuarial projection of the future valuation results for the City of Omaha Police and Fire Retirement System (COPFRS) over the next 30 years. This projection is based on the January 1, 2018 actuarial valuation results and was performed to examine the long-term funding of the System, given the current scheduled contribution rates and benefit structures in place.

This letter summarizes the results of our study and quantifies the expected changes in the funded ratio, unfunded actuarial liability, and full funding date (the year in which the actuarial assets is equal to or greater than the System's liability, i.e., no unfunded actuarial liability exists). For purposes of this study, the System's funding was studied each year over the long term, assuming all of the actuarial assumptions are met in the future, including the investment return assumption.

Results

The projection results that were used in our analysis require the use of many assumptions. Please see the "Disclaimers, Caveats, and Limitations" section later in this letter for a detailed discussion of the assumptions and methods used to produce the projected financial results for the System. To the extent actual experience deviates from that assumed, the future valuation results will also vary, perhaps significantly, from those in our projections.

Based on our projections, the Omaha Police and Fire Retirement System is expected to reach fully funded status (no unfunded actuarial liability) in the January 1, 2046 valuation. These projections assume all assumptions, including the investment return assumption (7.75%), are met in all future years.

Results

Exhibit 1, attached to this letter, shows the projected actuarial liability, actuarial assets, unfunded actuarial liability and funded ratio (actuarial assets divided by actuarial liability) for each year in the 30-year projection period for COPFRS. Exhibits 2 and 3 are graphs of the data on Exhibit 1. The blue bar is the portion of the total actuarial liability that is funded (which is equal to the lesser of the asset value and the actuarial liability) and the red bar represents the unfunded actuarial liability. The green bars near the end of the projection period reflect the fact that assets exceed the actuarial liability. As these exhibits indicate, COPFRS is projected to reach full funding (no unfunded actuarial liability) in 2046.

The projections are dependent on a number of factors including the actuarial assumptions used. If other assumptions were used, the results would vary, perhaps significantly.

Disclaimers, Caveats, and Limitations

This analysis is based primarily upon the benefit provisions, scheduled contribution rates and actuarial assumptions used in the January 1, 2018 actuarial valuation and the actuarial projection model prepared by Cavanaugh Macdonald Consulting, LLC. Significant items are noted below:

- An investment return assumption of 7.75% was used to project both assets and liabilities for the COPFRS.

- The liabilities and costs used in our analysis were based on the actuarial assumptions regarding mortality, disability, retirement, salary increases, and termination of employment used in the January 1, 2018 actuarial valuation.

- The number of active members in the System was assumed to remain at the current level over the entire projection period. When current active members were assumed to terminate or retire, they were replaced by new hires with a similar entry age as recent new hires.

- It was assumed there would be no change to the plan provisions or scheduled contribution rates over the projection period.

- The entry age normal cost method was used to develop the normal costs.

- We relied upon the membership data as provided by the City for the January 1, 2018 actuarial valuation. The numerical results depend on the integrity of this information. If there are material inaccuracies in the data, the results presented herein may be different and our calculations may need to be revised.

The projections used in our analysis are based on one set of assumptions out of a range of many possibilities over a 30-year projection period. A different set of assumptions could lead to different results. The projections are not intended to predict the System's financial condition or its ability to pay benefits in the future, and do not provide any guarantee of future financial soundness of the System. Over time, a defined benefit plan's total cost will depend on a number of factors including

the amount of benefits paid, the number of people paid benefits, the duration of the benefit payments, plan expenses, and the amount of earnings on assets invested to pay benefits. These amounts and other variables are uncertain and unknowable at the time our calculations were prepared. Because not all of the assumptions will unfold exactly as expected, actual results will differ from the projections. To the extent that actual experience deviates significantly from the assumptions, the funded status of the System could be significantly better or significantly worse than indicated in this study.

I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. I am available to provide additional information or answer questions if it is necessary or desirable.

Please feel free to contact me if you have questions or need anything further.

Sincerely,

Patrice Beckham

Patrice A. Beckham, FSA, FCA, EA, MAAA
Principal and Consulting Actuary

Exhibit 1

Omaha Police and Fire Retirement System

Projections of Future Valuation Results

Jan 1 Year	Unfunded Actuarial Liability ($M)	Actuarial Liability ($M)	Actuarial Assets ($M)	Funded Ratio
2018	$648.83	$1,355.43	$706.60	52.1%
2019	651.09	1,408.80	757.71	53.8%
2020	652.98	1,464.78	811.80	55.4%
2021	654.26	1,522.83	868.57	57.0%
2022	655.98	1,583.08	927.10	58.6%
2023	656.72	1,644.08	987.36	60.1%
2024	655.93	1,698.64	1,042.71	61.4%
2025	654.02	1,750.70	1,096.68	62.6%
2026	651.10	1,798.04	1,146.94	63.8%
2027	647.11	1,845.70	1,198.59	64.9%
2028	641.59	1,892.45	1,250.86	66.1%
2029	634.23	1,934.75	1,300.52	67.2%
2030	625.84	1,968.18	1,342.34	68.2%
2031	616.65	2,008.75	1,392.10	69.3%
2032	604.49	2,042.71	1,438.22	70.4%
2033	589.82	2,074.43	1,484.61	71.6%
2034	572.66	2,107.04	1,534.38	72.8%
2035	552.38	2,134.92	1,582.54	74.1%
2036	528.99	2,164.64	1,635.65	75.6%
2037	501.26	2,198.69	1,697.43	77.2%
2038	467.45	2,219.60	1,752.15	78.9%
2039	428.30	2,233.35	1,805.05	80.8%
2040	384.46	2,250.51	1,866.05	82.9%
2041	336.17	2,286.02	1,949.85	85.3%
2042	281.64	2,327.40	2,045.76	87.9%
2043	218.93	2,367.73	2,148.80	90.8%
2044	147.63	2,407.34	2,259.71	93.9%
2045	68.90	2,454.13	2,385.23	97.2%
2046	(19.01)	2,503.65	2,522.66	100.8%
2047	(117.30)	2,554.29	2,671.59	104.6%
2048	(225.52)	2,609.10	2,834.62	108.6%

Projections are based on the January 1, 2018 actuarial valuation and assume that all assumptions are met in the future, including the 7.75% assumed rate of return. To the extent actual experience differs from that assumed, the actual valuation results in future years will also differ from the projections shown here. Please see the January 1, 2018 valuation report for details on the actuarial methods and assumptions used in this study.

This exhibit is an attachment to a letter that contains important information and explanations regarding the numbers shown. Therefore, it should only be considered with the accompanying letter from Cavanaugh Macdonald Consulting dated October 2, 2018.

Exhibit 2

Omaha Police and Fire Retirement System

Projected Assets and Unfunded Actuarial Liability (UAL)

These projections assume that all actuarial assumptions are met in each future year, including the 7.75% assumed rate of return on the market value of assets. This graph should only be considered with the letter from Cavanaugh Macdonald Consulting dated October 2, 2018 which contains important information regarding the assumptions and methods used in the projections.

Exhibit 3

Omaha Police and Fire Retirement System

Projected Funded Ratio

These projections assume that all actuarial assumptions are met in each future year, including the 7.75% assumed rate of return on the market value of assets. This graph should only be considered with the letter from Cavanaugh Macdonald Consulting dated October 2, 2018 which contains important information regarding the assumptions and methods used in the projections.

As requested, we enclose the most recent Actuarial Experience Study which was submitted in March, 2018 and the most recent Actuarial Valuation Report which was presented to the Board in November, 2017. The System's actuary is in the process of finalizing the Actuarial Valuation Report effective January 1, 2018. We would anticipate approval by the Board on October 18, 2018 and we will provide that report to you as soon as possible after approval.

If you or the Committee should have any questions regarding this report please let me know.

Sincerely,

Stephen B. Curtiss
Finance Director

COPFRS EXHIBIT 1

ITEM	2013	2014	2015	2016	2017	2018
Funding Status	45%	47%	50%	51%	52%	Pending**
Assumed Rate of Return	8%	8%	8%	8%	8%	7.75%
Actual Return	18.5%	4.9%	0.7%	9.1%	15.0%	Pending*
Net Assets (actuarial value)	$495,847,234	$548,360,223	$590,191,585	$621,403,975	$656,171,797	Pending**
Unfunded Actuarial Accrued Liability	$613,027,544	$622,607,530	$598,810,636	$602,562,135	$611,737,378	Pending**
Normal Cost ($)	$26,403,410	$27,285,957	$26,946,719	$27,426,921	$27,892,194	Pending**
Normal Cost (%)	23.525%	23.102%	22.191%	22.146%	21.991%	Pending**
Member Contribution Rate	15.35%-17.15%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%	15.35%-17.23%
Employer Contribution Rate	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%	32.97%-33.67%
Actuarial Required Contribution	$52,895,180	$41,732,843	$42,918,856	$43,971,737	$45,297,654	Pending**
Blended Combined Contribution Rate	63.416%	53.208%	50.581%	50.543%	50.509%	Pending**
Actuarial Rate of Contribution (ARC)	62.272%	52.138%	50.013%	50.097%	50.212%	Pending**
Contribution Margin	-11.067%	-53.138%	0.550%	0.446%	0.297%	Pending**
Employer Actual Dollars Contributed	$35,302,037	$43,838,750	$41,851,986	$42,138,403	$43,235,242	Pending*
% of ARC by Employer Contribution	82.88%	96.16%	100.54%	101.81%	Pending**	Pending*

Pending* Info will be available at year end

Pending** Info is coming from 1-1-2018 Actuarial Valuation Report, which will be available soon

PUBLIC EMPLOYER RETIREMENT PLAN ANNUAL REPORT

(due on or before December 31 each calendar year)

Public Employer: <u>City of Omaha Police & Fire Retirement System</u>

Type of Retirement Plan: <u>Defined Benefit</u>

Plan Year: <u>Jan. - Dec.</u>
(e.g. Jan-Dec.; July-June)

Plan year covered by this report: <u>2017</u>

Number of plan participants:

1,450	Active Members
63	DROP Participants
992	Service Retirements
312	Surviving Spouses and Children
223	Disabled
22	Deferred Vested & Nonvested
3,062	

Contribution rates:

Fire Sworn:	<u>17.15%</u>	Employer:	<u>32.97%</u>
Fire Mngmt:	<u>17.23%</u>	Employer:	<u>33.17%</u>
Police Sworn:	<u>15.35%</u>	Employer:	<u>33.67%</u>
Police Mngmt:	<u>16.35%</u>	Employer:	<u>33.17%</u>

Plan Assets: <u>12/31/2017</u> $ 723,883,830
Plan Liabilities: <u>12/31/2017</u> $ 376,785

Names and Positions of persons administering the plan:

James Sklenar	Chairperson Board of Trustees
Michael Henrich	Vice Chairperson Board of Trustees
Mark Desler	Secretary, Trustee member of System
Stephen Curtiss	Administrator, Finance Director
Tim Young	Trustee, Human Resoursces Director
Vinny Palermo	Trustee, City Councilmember
Robert Mooney	Trustee not a member of the System

Names and Positions of persons investing plan assets

James Sklenar	Investment Committee Member, Chairperson Board of Trustees
Stephen Curtiss	Investment Committee Member, Administrator, Finance Director
Michael Henrich	Investment Committee Member, Vice Chairperson Board of Trustees

Form and Nature of Investments

Cash, Corporate Bonds, Government Bonds, Domestic and International Stock
Commodities, High Yield Bonds, Timberland, Hedge Fund, and Real Estate.

If a defined contribution plan, full description of investment policies and options
available to plan participants: NA

If a defined benefit plan, the number of members who are eligible for a benefit and the
total present value and level of such members' benefits, as well as the funding sources
which will pay for such benefits:

As of December 31, 2017		Actuarial Accrued Liability as of 1/1/2017:
Active Members:	1,450	$696,618,185
Drop Participants	63	$65,497,496
Service Retirement:	992	$688,908,955 (This amount represents for
Surviving Children & Spouse:	312	both retirees and surviving beneficiaries)
Disability Retirement:	223	$85,203,784
Deferred Vested/Nonvested:	22	$2,476,029
Total:	3,062	$1,538,704,449

Signature: _____   Date: October 1, 2018

Printed Name and Title/Position: Stephen B. Curtiss, Finance Director & Administrator

Mailing Address: 1819 Farnam Street, Suite 1004

                            Omaha, NE 68183

Telephone Number: 402-444-5417

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The experience and dedication you deserve

City of Omaha Police & Fire Retirement System
Annual Report to the Nebraska Legislative Committee

Presented by:
Patrice A. Beckham, FSA

December 3, 2018

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Background

- City ordinance requires a 50/50 split of costs between the city and members

- Both benefit provisions and contribution rates are negotiated in labor contracts

- COPFRS members include employees from four bargaining groups

  - Two have collective bargaining agreements in place through the end of 2018

  - Two (police union and management) have agreements in place through 2020

Background

- Due to funding outlook after Great Recession, significant changes to both benefit provisions and contributions were made in October, 2010 for police union and December, 2012 for fire union

  - Later retirement age
  - Requiring 30 YOS for maximum benefit instead of 25
  - Implementing Career Overtime Average (COTA) to eliminate spiking in pension amounts
  - Benefits based on highest 3 years vs highest one year
  - Pensions for new hires based only on base salary
  - Lower maximum benefit of 65% for all except Police union
  - Increased contributions by members and city

Historical Funded Status
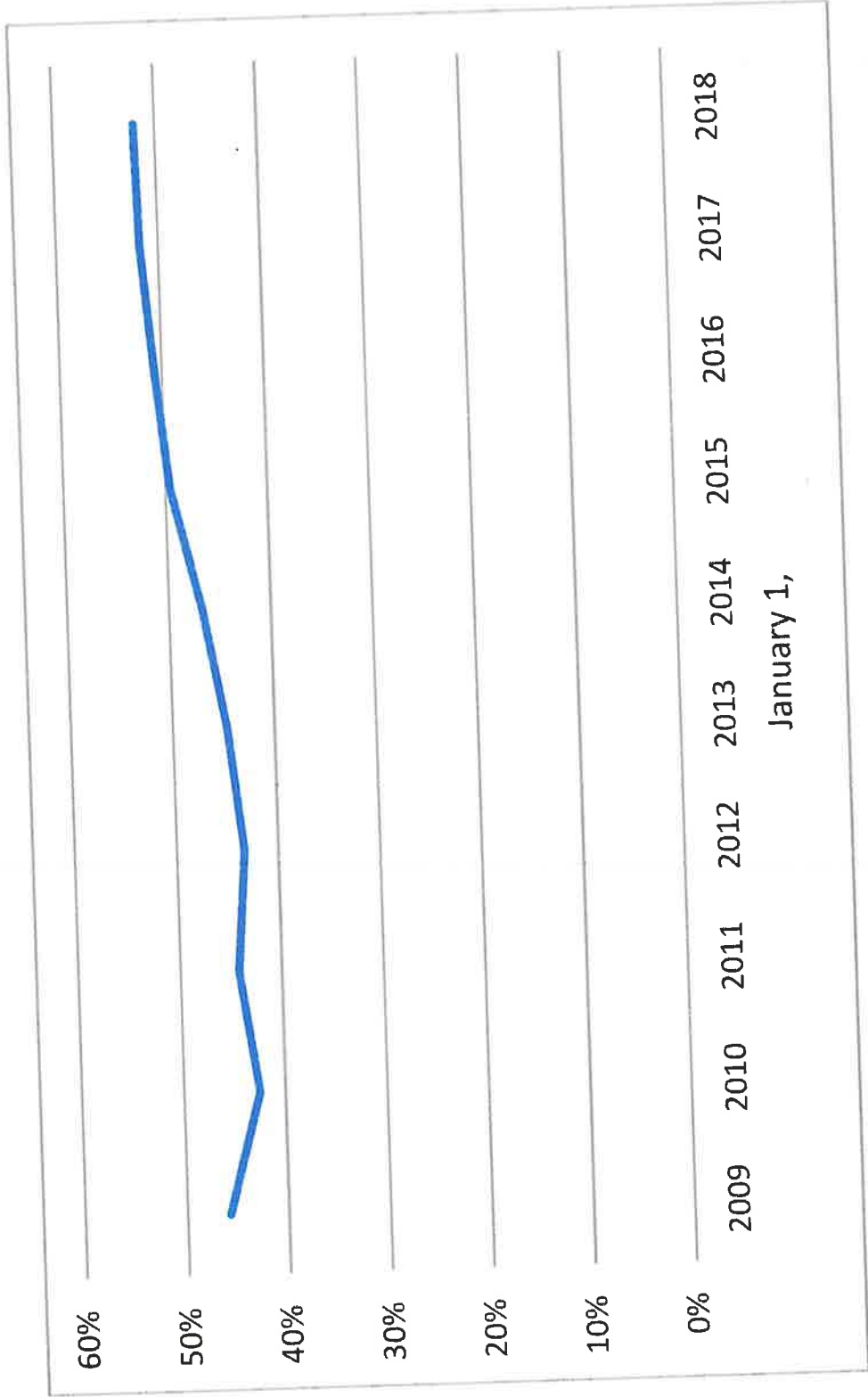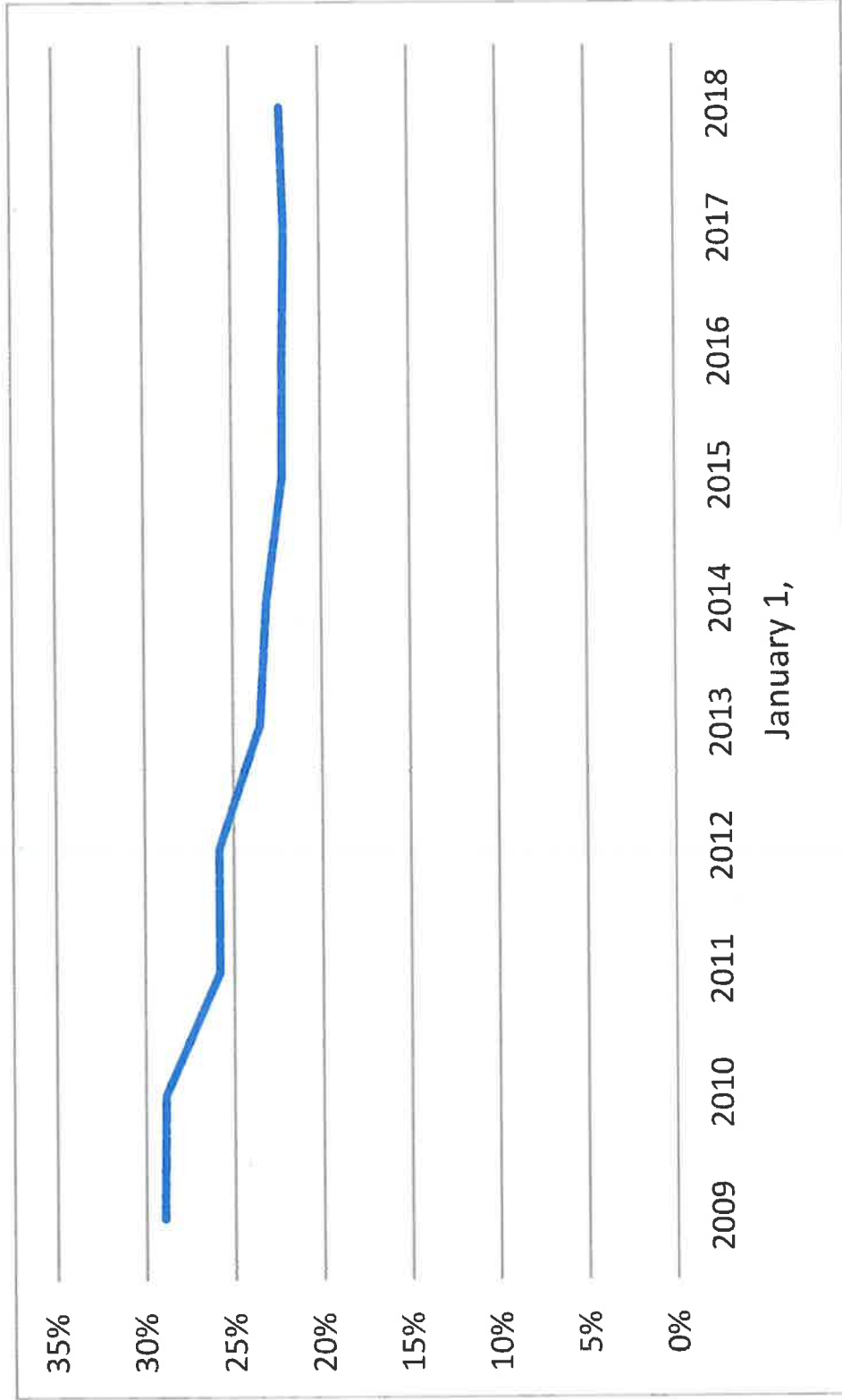
January 1,

Actual vs Actuarial Contributions

Chart showing Actual vs Actuarial Contributions by Fiscal Year Ending 12/31, with years 2009 through 2017 on the horizontal axis and Millions (0 to 60) on the vertical axis.

Legend: Annual Reqired Contribution | Actual Employer Contribution

Normal Cost Rate

Line chart showing Normal Cost Rate by January 1, from 2009 to 2018. Y-axis ranges from 0% to 35% in 5% increments. The blue line starts near 30% in 2009, declines to about 24-25% through 2012-2013, and continues declining to about 22% by 2015.

January 1, 2018
Actuarial Valuation

- Experience study performed in 2017 with results presented to the Board in 2018

- 2018 valuation reflects all recommended changes:
  - Lowering inflation assumption from 3.25% to 2.50%
    - Investment return assumption from 8.00% to 7.75%
    - General wage increase from 4.00% to 3.25%
    - Payroll growth assumption from 4.00% to 3.25%
  - Other changes (retirement, disability, termination of employment, merit component of salary increase) were less significant

January 1, 2018
Actuarial Valuation

➤ Changes to Actuarial Methods

- The UAL amortization method was changed to a layered approach where each year's new piece of UAL is amortized as an additional UAL layer and a new amortization base is established with payments as a level-percent of pay, over a closed 20-year period.

➤ Police 2014-2020 Labor Agreement

- Contribution rate for both Police members and the City increased by 0.75% in 2018
- Contribution rates will revert to previous rates after 2020 unless changed in subsequent labor agreements

Impact of Assumption Changes
(Measured on 1/1/18 Valuation)

	Old Assumptions	New Assumptions	Change
Actuarial Liability ($M)	$ 1,314.4	$ 1,355.4	$ 41.0
Actuarial Assets ($M)	706.6	706.6	0.0
Unfunded Actuarial Liability	$ 607.8	$ 648.8	$ 41.0
Funded Ratio (Actuarial Assets)	53.76%	52.13%	(1.63%)
1. Employee Contribution Rate	16.573%	16.573%	0.000%
2. City Contribution Rate Per Ordinance	33.750%	33.750%	0.000%
3. City Prior Service Payment	0.964%	0.964%	0.000%
4. Actuarial Contribution Rate	49.443%	53.199%	3.756%
5. Contribution Margin/(Shortfall)	1.844%	(1.912%)	(3.756%)
(1) + (2) + (3) − (4)			

Note: Numbers may not add due to rounding.

Key Valuation Measurements

	2018	2017	2016
Actuarial Liability ($M)	$1,355	$1,268	$1,224
Actuarial Assets ($M)	707	656	621
Unfunded Actuarial Liability	$649	$612	$603
Funded Ratio (Actuarial Assets)	52%	52%	51%
Funded Ratio (Market Assets)	53%	50%	49%
Scheduled Contribution Rate	51.287%	50.509%	50.543%
Actuarial Contribution Rate	(53.199%)	(50.212%)	(50.097%)
Contribution Margin/(Shortfall)	(1.912%)	0.297%	0.446%

Note: numbers may not add due to rounding.

2018 Active Membership by Tier

Active Counts	Police	Fire	Total
Tier 1*	560	546	1,106
Tier 2*	253	87	340
Total	813	633	1,446
Percentage of Tier 2 Actives	31%	14%	24%

Police - Pre-2010

Police - Post-2010

Fire - Pre-2013

Fire - Post-2013
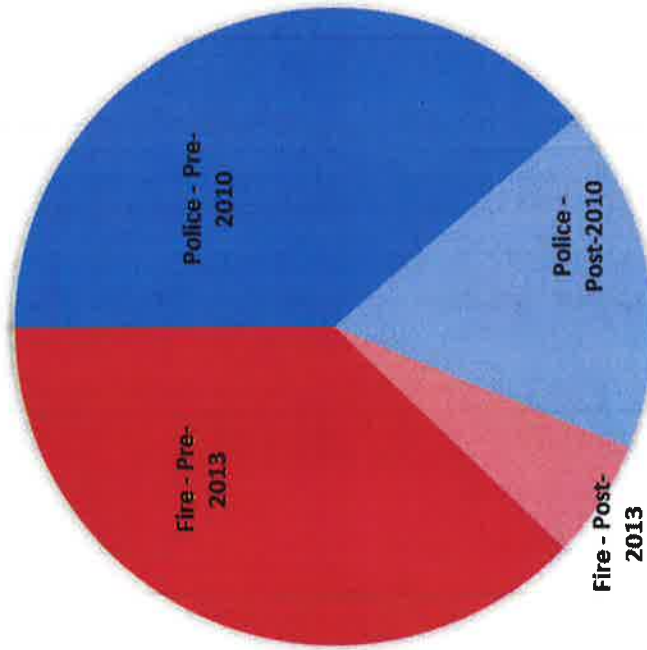
* Tier 2 members are actives hired after January 1, 2010 for Police and January 1, 2013 for Fire.

Asset Values ($M)

	Market	Actuarial
Assets, 1/1/2017	$ 636.4	$ 656.2
▪ Contributions	68.4	68.4
▪ Benefit Payments	(75.8)	(75.8)
▪ Investment Income	94.5	57.8
Assets, 1/1/2018	$ 723.5	$ 706.6
Estimated Net Return	14.9%	8.9%

Return of 8.9% produced an actuarial gain of $6M on actuarial value of assets.

Deferred investment gain at 1/1/2018 is $17 million compared to deferred investment loss of $20 million at 1/1/2017.

Actuarial Liabilities by Group

- Retirees and Beneficiaries
- Disabled Members
- Inactive Vested Members
- DROP Participants
- Active Fire Members
- Active Police Members

$717.3M

$244.2M

$234.0M

$69.6M

$2.5M

$87.9M
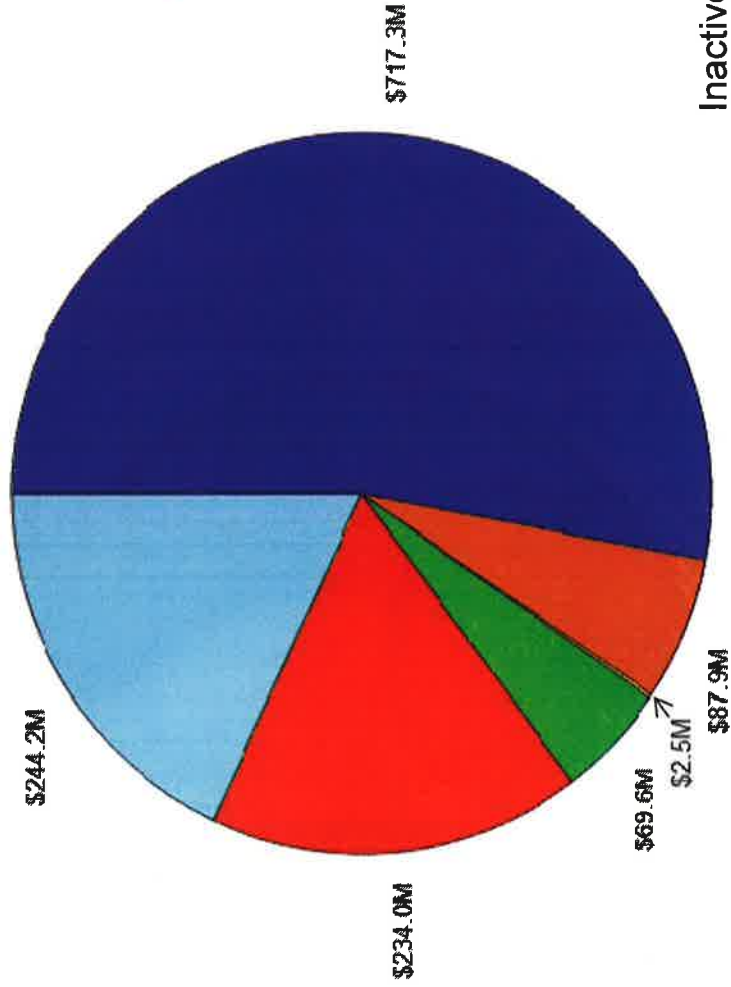
Inactive Actuarial Liability: $877M
Active Actuarial Liability: $478M
Total Actuarial Liability: $1,355M

Note: numbers may not add due to rounding.

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Unfunded Actuarial Liability ($M)

	2017	2016	2015
UAL January 1	$612	$603	$599
– Expected increase from amortization method	10	11	11
– Contributions below/(above) actuarial rate	(1)	(1)	0
– Investment experience	(6)	7	9
– Liability experience	(5)	(8)	(7)
– Other experience	(2)	0	0
– Assumption/data changes	41	0	0
– Change in valuation of QDRO records	0	0	(9)
UAL December 31	$649	$612	$603

Actuarial Contribution Rate

	Jan 1, 2018	Jan 1, 2017	Jan 1, 2016
Normal Cost	22.211%	21.991%	22.146%
UAL Payment	30.988%	28.221%	27.951%
Total Actuarial Rate	53.199%	50.212%	50.097%
Member Rate	16.573%	16.165%	16.177%
Employer Rate	34.714%	34.344%	34.366%
Total Contribution Rate	51.287%	50.509%	50.543%
Margin/(Shortfall)	(1.912%)	0.297%	0.446%

Contribution shortfall does not necessarily mean the System will never reach full funding. Open group projections are necessary to evaluate the System's long term funding.

Change in Contribution Rate

Actuarial Rate - January 1, 2017	**50.212%**
– Investment experience	(0.251)
– Demographic experience	(0.219)
– Other experience	(0.154)
– Contributions above the actuarial rate	(0.030)
– Change in normal cost rate	(0.092)
– Payroll growth higher than expected	(0.023)
– Assumption changes	3.756
Actuarial Rate - January 1, 2018	**53.199%**

Projections

- Valuation results are a single point in time measurement and do not lend insight into future trends
  - Contribution rates are fixed in bargaining agreements (actuarial contribution rate is not made each year)
  - Open group projections are needed to determine future funding trends

- Projections assume all assumptions are met each year in the future
  - We know this particular scenario will not happen, but the important result is the trend of the funding level
  - Actual experience each year, both favorable and unfavorable, will change the projected date of full funding
  - Continual monitoring is critical to sustainability of the system

Long Term Projections
Funded Ratio

The funded ratio is projected to reach 100% in 2046

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The City of Omaha
Police & Fire Retirement System

Actuarial Valuation as of
January 1, 2018

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Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

November 6, 2018

Board of Trustees
City of Omaha Police and Fire Retirement System
1819 Farnam Street
Omaha, NE 68183

RE: January 1, 2018 Actuarial Valuation

Dear Members of the Board:

In accordance with your request, we have completed an actuarial valuation of the City of Omaha Police and Fire Retirement System as of January 1, 2018 for the plan year ending December 31, 2018. The major findings of the valuation are contained in this report. There have been several changes to the actuarial assumptions and methods used in this valuation as a result of the completion of an experience study in March 2018. All of the recommended changes from the experience study were adopted by the Board of Trustees and are first used in this valuation. This report also reflects the increase of 0.75% in the contribution rates for both the City and the Police members for 2018-2020 that was included in the 2014 to 2020 labor agreement. After 2020, the contribution rates for Police members and the related City contributions will revert to previous levels. The net impact of all assumption, method and contribution changes was an increase in both the unfunded actuarial liability and the total actuarial contribution rate.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the City's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information provided in prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: experience differing from that anticipated by the 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 System's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this report are for purposes of determining the actuarial contribution rates for funding the System based on the Board's funding policy. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are provided in separate reports.

The consultants who worked on this assignment are pension actuaries. CMC's advice is not intended to be a substitute for qualified legal or accounting counsel.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries, have experience in performing valuations for public retirement plans, and meet the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board and the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement plan and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System and future expectations. However, the Board of Trustees has the final decision regarding the selection of the assumptions and adopted them as indicated in Appendix B.

We respectfully submit the following report and look forward to discussing it with you.

Sincerely,

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Bryan Hoge, FSA, EA, FCA, MAAA
Senior Actuary

TABLE OF CONTENTS

This report presents the results of the January 1, 2018 actuarial valuation of the City of Omaha Police and Fire Retirement System. The primary purposes of performing the valuation are:

- to estimate the liabilities for the future benefits expected to be provided by the System;
- to determine the actuarial contribution rate, based on the System's funding policy;
- to measure and disclose various asset and liability measures;
- to monitor any deviation between actual System experience and experience predicted by the actuarial assumptions so that recommendations for assumption changes can be made when appropriate;
- to analyze and report on any significant trends in contributions, assets and liabilities over the past several years.

There have been several changes to the actuarial assumptions and methods used in this valuation as a result of the four-year experience study completed in March 2018. All of the recommended changes were adopted by the Board of Trustees and are first used in this valuation, including:

- Inflation assumption decreased from 3.25% to 2.50%.
- Investment return assumption decreased from 8.00% to 7.75%.
- General wage growth assumption decreased from 4.00% to 3.25%.
- Covered payroll growth assumption decreased from 4.00% to 3.25%.
- Retirement/DROP rates were adjusted to better reflect the actual experience.
- Disability rates were reduced by 20%.
- Termination rates were changed from age-based to service-based rates and separate assumptions were developed for Police members and Fire members.
- The merit component of the salary increase assumption for Police members was adjusted to better reflect the changes to the pay schedules that occurred in 2018 under the current contract.
- The amortization method for the unfunded actuarial liability (UAL) was changed from a single amortization base with a closed 30-year amortization period, beginning with the January 1, 2014 valuation, to a "layered" amortization approach. Under this method, the UAL as of January 1, 2018 will continue to be amortized according to the current schedule (26 years remain as of January 1, 2018). Any new UAL generated as a result of actuarial experience in subsequent years will be amortized separately as an additional layer with it a separate amortization payment schedule, as a level-percent of pay, over a closed 20-year period.

Because the amortization of the unfunded actuarial liability as of January 1, 2018 will remain on the current schedule (26 years remaining as of January 1, 2018), the change to the amortization method did not impact the January 1, 2018 valuation results. The impact of the change in the UAL amortization methodology will first impact the January 1, 2019 valuation. The changes to the actuarial assumptions increased the actuarial liability by $41 million and the total actuarial contribution rate by 3.756% of pay. The most significant cost impact was due to the change to the investment return assumption.

In addition to the changes to the actuarial assumptions and methods, this valuation also reflects the increase of 0.75% in the contribution rates for both the City and the Police members for 2018-2020 that was included in the 2014 to 2020 labor agreement. After 2020, the contribution rates for Police members and the related City contributions will revert to the previous levels.

The combined impact of the assumption, method and contribution rate changes on the January 1, 2018 valuation results is summarized in the following table ($ millions):

	Old Assumptions and Methods	New Assumptions and Methods	Difference
Actuarial Liability (AL)	$1,314.4	$1,355.4	$41.0
Actuarial Value of Assets (AVA)	706.6	706.6	0.0
Unfunded AL (UAL)	$ 607.8	$ 648.8	$41.0
Funded Ratio	53.76%	52.13%	(1.63%)
Employee Contribution Rate	16.573%	16.573%	0.000%
City Contribution Rate Per Ordinance	33.750%	33.750%	0.000%
City Prior Service Payment	0.964%	0.964%	0.000%
Normal Cost Rate	21.899%	22.211%	0.312%
UAL Contribution Rate	27.544%	30.988%	3.444%
Total Actuarial Contribution Rate	49.443%	53.199%	3.756%
Contribution (Shortfall)/Margin	1.844%	(1.912%)	(3.756%)

Note: Numbers may not add due to rounding.

The actuarial valuation results provide a "snapshot" view of the System's financial condition on January 1, 2018. The UAL in the current valuation is $649 million, an increase of $37 million from last year's UAL of $612 million. The increase is primarily due to the changes to the actuarial assumptions, previously discussed. The valuation results reflect net favorable experience for the past plan year as determined by the fact the actual UAL was lower than expected, based on the actuarial assumptions used in the January 1, 2017 actuarial valuation. Favorable experience on the actuarial value of assets resulted in an actuarial gain of $6 million, and favorable demographic experience produced an actuarial gain on liabilities of $5 million. The favorable demographic experience was primarily due to salary increases that were smaller than expected, based on the actuarial assumptions.

The System uses an asset smoothing method in the valuation process. As a result, the System's funded status and the actuarial contribution rate are based on the actuarial (smoothed) value of assets – not the pure market value. The investment return on the market value of assets during 2017, net of investment expenses, was 14.9%, higher than the assumed rate of return (8.0% for 2017). Due to unfavorable deferred investment experience from prior years, the rate of return on the actuarial value of assets for the 2017 plan year was 8.9%. The System's deferred investment experience went from a $20 million deferred loss in last year's valuation to a $17 million deferred gain in the current valuation (market value of assets greater than actuarial value). Actual returns over the next few years will determine the rate at which the deferred investment gain of $17 million is recognized. With the current deferred gains, a return of 5% on the market value of assets in 2018 would result in a 7.75% return on the actuarial value of assets.

A summary of the key results from the January 1, 2018 valuation is shown in the following table. Additional detail on the changes and experience affecting the valuation results can be found in the following sections of this Board Summary.

	January 1, 2018	January 1, 2017
Unfunded Actuarial Liability ($M)	$648.8	$611.7
Funded Ratio (Actuarial Assets)	52.13%	51.75%
Employee Contribution Rate	16.573%	16.165%
Total City Contribution Rate	34.714%	34.344%
Normal Cost Rate	22.211%	21.991%
UAL Amortization Rate	30.988%	28.221%
Total Contribution Rate	53.199%	50.212%
Contribution (Shortfall)/Margin	(1.912%)	0.297%

MEMBERSHIP

There were 1,446 active members in the 2018 valuation compared to 1,424 in the 2017 valuation, a 1.5% increase. The graph on the next page shows the number of active members in the valuation over the last 12 years. The size if the active group has varied somewhat over this period, but remained around 1,400 in most years. The current active count of 1,446 is the highest during the 12 year period. When the number of active members increases, it has a positive influence on the System's funding as a larger amount of contributions is received. In addition, the UAL contribution rate is favorably impacted by a larger group of active members and the resulting higher payroll. Going forward, the UAL is amortized assuming covered payroll will grow at 3.25% per year. If total payroll grows more than 3.25%, the UAL payment is divided by payroll that is larger than expected, which results in a smaller UAL contribution rate.

The graph also shows the portion of total actives covered by Tier 1 provisions and Tier 2 provisions (for Police members hired on/after January 1, 2010 and Fire members hired on/after January 1, 2013). In the 2018 valuation, there were 340 Tier 2 members, about 24% of the total active membership. In the January 1, 2017 valuation, the about 19% of the total active group were Tier 2 members.

Active Membership
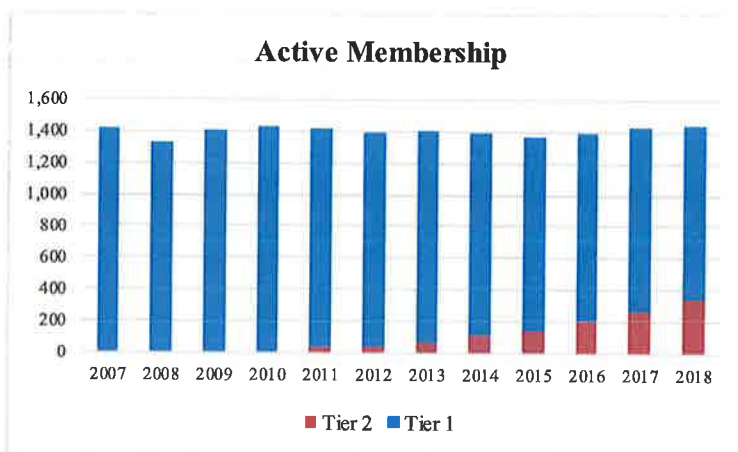
ASSETS

As of January 1, 2018, the System had total funds of $723.5 million, when measured on a market value basis. This was an increase of $87.1 million from the prior year and represents an approximate net rate of return of around 15%.

The market value of assets is not used directly in the actuarial calculation of the System's funded status and the actuarial contribution rate. An asset valuation method is used to smooth the effects of market fluctuations. The actuarial value of assets is equal to the expected asset value (based on last year's actuarial value of assets, net cash flows and a rate of return equal to the actuarial assumed rate of return for 2017 of 8.0%) plus 25% of the difference between the actual market value and the expected asset value. See Exhibit 2 for the detailed development of the actuarial value of assets as of January 1, 2018. The rate of return on the actuarial value of assets was 8.9% which is above the assumed return of 8.0% during 2017.

The components of the change in the market value and actuarial value of assets are shown below:

	Market Value ($M)		Actuarial Value ($M)	
Net Assets, January 1, 2017	$	636.4	$	656.2
• City and Member Contributions	+	68.4	+	68.4
• Benefit Payments and Refunds	−	75.8	−	75.8
• Investment Gain/(Loss)	+	94.5	+	57.8
Net Assets, January 1, 2018	$	723.5	$	706.6
Estimated Net Rate of Return		14.9%		8.9%

The deferred investment gain that is not recognized as of January 1, 2018 is $16.9 million, compared with a deferred investment loss of $19.8 million in last year's valuation. The unrecognized gain will be reflected in the determination of the actuarial value of assets for funding purposes over time, to the extent there are not future losses to offset the deferred gain. This means that earning the assumed net rate of investment return of 7.75% per year on a market value basis will result in an actuarial gain on the actuarial value of assets in the future.

The unrecognized investment gain is 2.3% of the market value of assets at January 1, 2018. If the deferred gain was recognized immediately in the actuarial value of assets, the unfunded actuarial liability would decrease by $16.9 million to $631.9 million, the funded percentage would increase from 52% to 53%, the actuarially determined contribution rate would decrease from 53.199% to 52.405%, and the contribution shortfall of 1.228% would decrease to 0.434%.

A comparison of asset values on both a market and actuarial basis for the last six years is shown below:

	January 1 ($M)					
	2018	2017	2016	2015	2014	2013
Actuarial Value of Assets	$707	$656	$621	$590	$548	$496
Market Value of Assets	$724	$636	$594	$600	$579	$490
Actuarial Value/Market Value	98%	103%	105%	98%	95%	101%
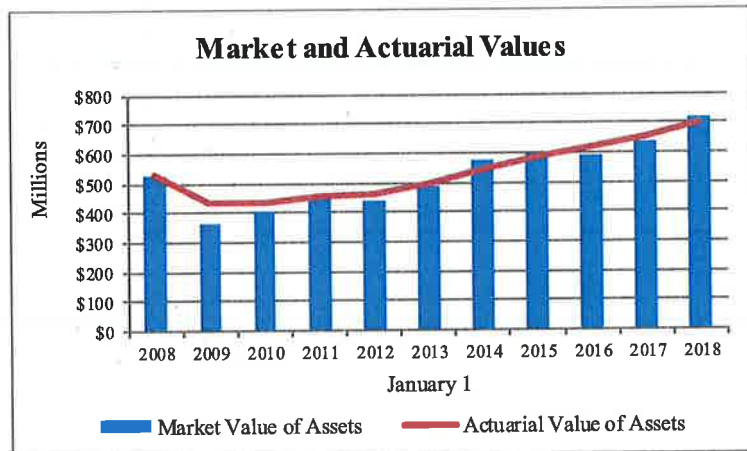
An asset smoothing method is used to mitigate the volatility in the market value of assets. By using a smoothing method, the actuarial (or smoothed) value is expected to be both above and below the pure market value at different points in time. The significant investment losses in 2008 resulted in the actuarial value of assets exceeding the market value from 2009 through 2013. Since 2014, the actuarial and market values have been relatively close.
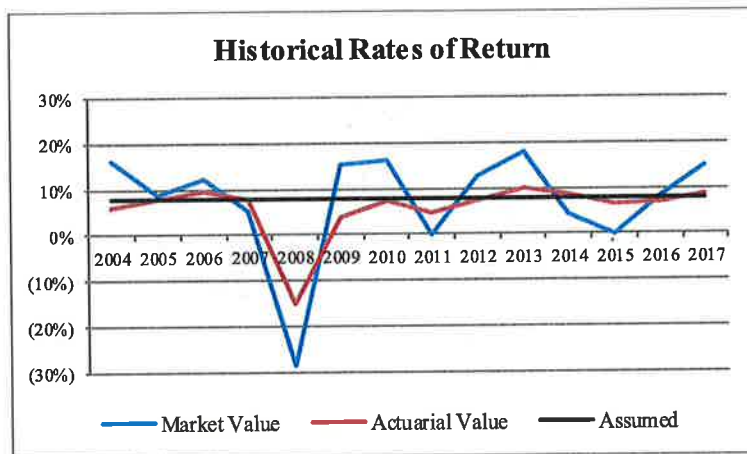
The rate of return on the actuarial value of assets has been less volatile than the rate of return on the market value of assets, which is the reason for using a smoothing method. However, during this time period, the rate of return on the actuarial value of assets has been at or below the assumed rate of return for most of the period. Due to smoothing, the calendar year 2008 return impacted the return on actuarial value for many years.

LIABILITIES

The first step in determining the contribution level for the System is to calculate the liabilities for all expected future benefit payments. These liabilities represent the present value of future benefits (PVFB) expected to be earned by the current members, assuming that all actuarial assumptions are realized. Thus, the PVFB reflects service and salary increases that are expected to occur in the future before benefit payments commence. The various components of the PVFB can be found in the liabilities portion of the valuation balance sheet (see Exhibit 3).

The other critical measurement of System liabilities in the valuation process is the actuarial liability. This is the portion of the PVFB that will not be paid by the future normal costs (i.e. it is the portion of the PVFB that is allocated to past service).

The following chart compares the actuarial liability and assets for the current and prior valuation.

	As of January 1	
	2018	2017
Actuarial Liability	$ 1,355,429,537	$ 1,267,909,175
Assets at Actuarial Value	(706,595,615)	(656,171,797)
Unfunded Actuarial Liability (Actuarial Value)	$ 648,833,922	$ 611,737,378
Funded Ratio (Actuarial Value)	52%	52%
Actuarial Liability	$ 1,355,429,537	$ 1,267,909,175
Assets at Market Value	(723,507,045)	(636,381,482)
Unfunded Actuarial Liability (Market Value)	$ 631,922,492	$ 631,527,693
Funded Ratio (Market Value)	53%	50%

Note that the funded ratio does not indicate whether or not the System assets are sufficient to settle benefits earned to date. The funded ratio, by itself, also may not be indicative of future funding requirements.

EXPERIENCE FOR THE 2017 PLAN YEAR

The difference between the actuarial liability and the actuarial value of assets at the same date is referred to as the unfunded actuarial liability (UAL). Benefit improvements, experience gains/losses, changes in the actuarial assumptions or methods, and actual contributions made will impact the amount of the unfunded actuarial liability.

Experience or actuarial gains (or losses) result from actual experience that is more (or less) favorable than anticipated based on the actuarial assumptions. These "experience" (or actuarial) gains or losses are reflected in the unfunded actuarial liability and are measured as the difference between the expected unfunded actuarial liability and the actual unfunded actuarial liability, taking into account any changes due to assumptions, methods or benefit provision changes. The experience for 2017, in total, was favorable. There was an actuarial gain of $6 million on the actuarial value of assets and an actuarial gain of $5 million on actuarial liabilities. The largest source of gain was due to actual salary increases that were lower than expected, based on the assumptions in the 2017 valuation.

The change in the unfunded actuarial liability between January 1, 2017 and January 1, 2018 is shown below (in millions):

Unfunded Actuarial Liability, January 1, 2017		**$612**
·	Expected change in UAL	10
·	Contribution surplus in 2017	(1)
·	Investment experience	(6)
·	Demographic experience	(5)
·	Assumption changes	41
·	Other experience	(2)
Unfunded Actuarial Liability, January 1, 2018		**$649**

CONTRIBUTION LEVELS

The actuarial contribution to the System is composed of two parts:

(1) The normal cost (which is the allocation of costs attributed to the current year of service) and,
(2) The amortization payment on the Unfunded Actuarial Liability (UAL).

The normal cost rate is independent of the System's funded status and represents the cost, as a percent of payroll, of the benefits provided by the System which is allocated to the current year of service.

Beginning with the 2018 valuation, the UAL will be amortized using a "layered" approach. To implement the new method, the UAL as of January 1, 2018 will continue to be amortized according to the current schedule (26 years remain as of January 1, 2018). Each new amount of UAL generated as a result of actuarial experience in subsequent years will be established as a separate UAL base, with a separate payment schedule over a closed 20-year period.

		January 1, 2018	January 1, 2017	% Chg
1.	Normal Cost Rate	22.211%	21.991%	1.0
2.	UAL Contribution Rate	30.988%	28.221%	9.8
3.	Total Contribution Rate (1) + (2)	53.199%	50.212%	5.9
4.	Employee Contribution Rate	16.573%	16.165%	2.5
5.	City Contribution Per Ordinance	33.750%	33.346%	1.2
6.	City Prior Service Payment	0.964%	0.998%	(3.4)
7.	Contribution (Shortfall)/Margin (4) + (5) + (6) - (3)	(1.912%)	0.297%	(743.8)

The total normal cost for the System is 22.211% of pay. When offset by the expected employee contributions for 2018, the employer portion of the normal cost is 5.638% of pay. The normal cost represents the long-term cost of the benefit structure in the System, given the current actuarial assumptions

and plan membership. As current active member leave in the future and are replaced by new hires who are covered by a different benefit structure, with a lower cost, the normal cost rate is expected to decline. The System's total actuarial contribution rate (payable as a percent of member payroll) increased by 2.987% of pay, from 50.212% in the January 1, 2017 valuation to 53.199% in the January 1, 2018 valuation. As a result, there is a contribution shortfall of 1.912% in the current valuation (actual contribution rates are less than the actuarial contribution rate). The primary components of the change in the total actuarial contribution rate are shown in the following table:

	Rate	
Total Actuarial Contribution Rate, January 1, 2017	50.212	%
• Actuarial (Gain) / Loss - Investment Experience	(0.251)	
• Actuarial (Gain) / Loss - Demographic Experience	(0.219)	
• Other Experience	(0.154)	
• Contributions Above The Actuarial Rate	(0.030)	
• Change in Normal Cost Rate	(0.092)	
• Payroll Growth Higher than Expected	(0.023)	
• Assumption Changes	3.756	
Total Actuarial Contribution Rate, January 1, 2018	53.199	%

As the table above shows, the most significant factor in the increase in the actuarial contribution rate was the new set of actuarial assumptions, which increased the actuarial contribution rate by 3.756%. Due to the magnitude of the increase in the actuarial contribution rate, last year's contribution margin of 0.297% of pay has become a contribution shortfall of 1.912% of pay in the current valuation.

COMMENTS

There have been several changes to the actuarial assumptions and methods used in this valuation as a result of the four-year experience study completed in March 2018, the most significant of which was decreasing the investment return assumption from 8.00% to 7.75%. The changes to the actuarial assumptions increased the actuarial liability by $41 million and the total actuarial contribution rate by 3.756% of pay.

On January 1, 2018, the actuarial value of assets was $707 million and the market value of assets was $724 million. Due to the return on the market value of assets of 14.9%, the deferred investment loss of $20 million that existed in the prior valuation has become a $17 million deferred investment gain in the current valuation. The return on the actuarial value of assets was above the assumed rate of return (8.0% for the 2017 plan year) which resulted in a $6 million actuarial gain. There was a liability gain of $5 million during 2017, primarily due to salary increases that were smaller than expected, based on the actuarial assumptions. The funded ratio based on the actuarial value of assets of the System remains low but held steady at 52%, despite the impact of the new set of assumptions in the current valuation.

As of January 1, 2018, there were 340 Tier 2 members, about 24% of the total active membership, up from 19% in the January 1, 2017 valuation. As a higher portion of total actives is covered by Tier 2 provisions, the normal cost of the System will continue to decline. However, the majority of the liability will remain with the Tier 1 members for many years.

Despite a scheduled contribution increase of 1.50% (from Police members and the City), the actuarial contribution rate for calendar year 2018 exceeds the current contribution rates for the members and the City, producing a contribution shortfall of 1.912% of payroll. The contribution shortfall of 1.912% is based on the actuarial valuation performed on January 1, 2018 which is a snapshot measurement on that date and which assumes no future change in either the normal cost rate or the UAL contribution rate. While the System's financial health is expected to improve in future years due to a decrease in the normal cost over time, the impact on the System's long-term funding cannot be quantified without performing an open group projection of future valuation results. Such a project is outside the scope of this valuation assignment, but a model was requested by the City as a special project this year. The results indicate that the System is expected to reach full funding in 2046 if all assumptions are met, including an annual return of 7.75%. We strongly encourage the System to perform similar modeling annually to assist the Board and other interested parties in the evaluation of the long-term financial health of the System.

As mentioned earlier in this report, the System uses an asset smoothing method in the actuarial valuation. While this is a very common practice for public retirement systems, it is important to be aware of the potential impact of the unrecognized investment experience. The key valuation results from the 2018 valuation, using both the actuarial and market value of assets, are shown in the following table to provide full disclosure of the impact of asset smoothing on the funding of the System.

($ Millions)	Using Actuarial Value of Assets	Using Market Value of Assets
Actuarial Liability	$1,355.4	$1,355.4
Asset Value	706.6	723.5
Unfunded Actuarial Liability	648.8	631.9
Funded Ratio	52.1%	53.4%
Normal Cost Rate	22.211%	22.211%
UAL Contribution Rate	30.988%	30.194%
Actuarial Contribution Rate	53.199%	52.405%
Employee Contribution Rate	16.573%	16.573%
City Contribution Rate	34.714%	34.714%
Contribution (Shortfall)/Margin	(1.912%)	(1.118%)

THE CITY OF OMAHA POLICE AND FIRE RETIREMENT SYSTEM

PRINCIPAL VALUATION RESULTS

	January 1, 2018	January 1, 2017	% Chg
MEMBERSHIP			
1. Active Membership			
- Police Active Members			
- Tier 1	560	590	(5.1)
- Tier 2	253	208	21.6
- Total	813	798	1.9
- Fire Active Members			
- Tier 1	546	558	(2.2)
- Tier 2	87	68	27.9
- Total	633	626	1.1
- Total Active Members	1,446	1,424	1.5
- Number of DROP Participants	63	57	10.5
- Total Employees	1,509	1,481	1.9
- Projected Payroll for Upcoming Fiscal Year	$137,647,929	$133,044,481	3.5
- Average Projected Pay	$91,218	$89,834	1.5
2. Inactive Membership			
- Number of Retirees / Beneficiaries	1,262	1,263	(0.1)
- Number of Disabled Members	223	225	(0.9)
- Number of Inactive Vesteds	11	13	(15.4)
- Average Annual Benefit	$48,068	$46,642	3.1
- Number of Participants Due a Refund	11	7	57.1
ASSETS AND LIABILITIES			
1. Net Assets			
- Market Value	$723,507,045	$636,381,482	13.7
- Actuarial Value	$706,595,615	$656,171,797	7.7
2. Actuarial Liability	$1,355,429,537	$1,267,909,175	6.9
3. Unfunded Actuarial Liability	$648,833,922	$611,737,378	6.1
4. Funded Ratios			
Actuarial Value Assets / Actuarial Liability	52.13%	51.75%	0.7
Market Value Assets / Actuarial Liability	53.38%	50.19%	6.4
CONTRIBUTIONS			
1. Normal Cost Rate	22.211%	21.991%	1.0
2. UAL Rate	30.988%	28.221%	9.8
3. Total Contribution Rate (1) + (2)	53.199%	50.212%	5.9
4. Employee Contribution Rate	16.573%	16.165%	2.5
5. City Contribution Per Ordinance	33.750%	33.346%	1.2
6. City Prior Service Payment	0.964%	0.998%	(3.4)
7. Contribution (Shortfall)/Margin (4) + (5) + (6) - (3)	(1.912%)	0.297%	(743.8)

EXHIBIT 1

SUMMARY OF FUND ACTIVITY

(Market Value Basis)

For Year Ended December 31, 2017

Assets at January 1, 2017	$	636,381,482
Receipts:		
City Contributions		46,608,741
Employee Contributions		21,758,246
Investment Earnings, Net of Expenses		94,553,386
Total Receipts		162,920,373
Disbursements:		
Benefits Payments		70,852,817
Refund of Contributions		4,930,300
Administrative Expenses		11,693
Total Disbursements		75,794,810
Assets as of December 31, 2017	$	723,507,045
Annualized Net Yield		14.9%

EXHIBIT 2

DETERMINATION OF ACTUARIAL VALUE OF ASSETS

The actuarial value of assets is used to minimize the impact of annual fluctuations in the market value of investments on the contribution rate. The current asset valuation method is called the "Expected +25% Method."

The "expected value" of assets is determined by applying the investment return assumption to last year's actuarial value of assets and the net difference of receipts and disbursements for the year. The actual market value is compared to the expected value and 25% of the difference (positive or negative) is added to the expected value to arrive at the actuarial value of assets for the current year.

1. Actuarial Value of Assets as of January 1, 2017 $ 656,171,797

2. Actual Receipts / Disbursements
   a. Total Contributions   68,366,987
   b. Benefit Payments/Other   (75,783,117)
   c. Net Change   (7,416,130)

3. Expected Actuarial Value of Assets as of January 1, 2018   700,958,472
   $[(1) * 1.08] + [(2c) * 1.08^{\frac{1}{2}}]$

4. Market Value of Assets as of January 1, 2018   723,507,045

5. Excess of Market Value over Expected Actuarial   22,548,573
   Value as of January 1, 2018

6. Preliminary Actuarial Value of Assets as of January 1, 2018   706,595,615
   $[(3) + 25\% \text{ of } (5)]$

7. Calculation of 20% Corridor
   a. 80% of (4)   578,805,636
   b. 120% of (4)   868,208,454

8. Final Actuarial Value of Assets as of January 1, 2018
   (6), but not < (7a), nor > (7b) $ 706,595,615

9. Rate of Return on Actuarial Value of Assets   8.9%

EXHIBIT 2 (continued)

A historical comparison of the market and actuarial value of assets is shown below:

Date	Market Value of Assets (MVA)	Actuarial Value of Assets (AVA)	AVA / MVA
1/1/2008	$529,923,390	$530,493,413	100.1%
1/1/2009	365,923,877	439,108,652	120.0%
1/1/2010	405,390,038	440,478,409	108.7%
1/1/2011	452,640,303	456,158,774	100.8%
1/1/2012	440,429,392	467,375,458	106.1%
1/1/2013	489,800,140	495,847,234	101.2%
1/1/2014	579,494,652	548,360,223	94.6%
1/1/2015	599,927,168	590,191,585	98.4%
1/1/2016	594,178,499	621,403,975	104.6%
1/1/2017	636,381,482	656,171,797	103.1%
1/1/2018	723,507,045	706,595,615	97.7%
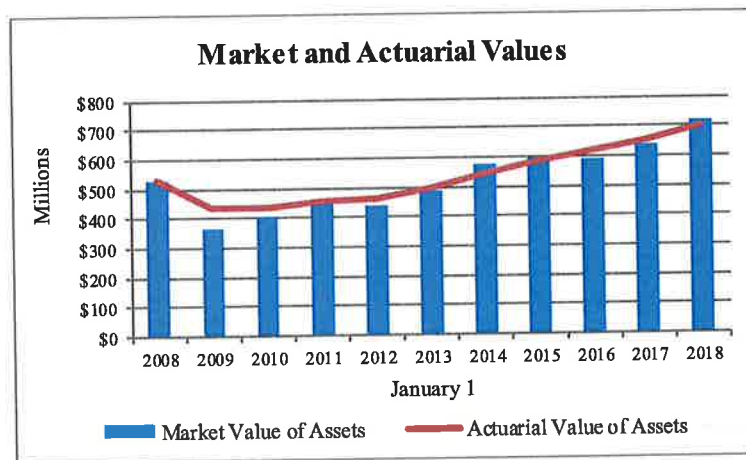
EXHIBIT 3

ACTUARIAL BALANCE SHEET

An actuarial statement of the status of the plan in balance sheet form as of January 1, 2018 is as follows:

Assets

Current assets (actuarial value)	$	706,595,615
Present value of future normal costs		259,043,076
Present value of future contributions to fund unfunded actuarial liability		648,833,922
Total Assets	$	1,614,472,613

Liabilities

Present value of future retirement benefits for:

Active employees	$	719,284,138		
DROP participants - account balances		11,537,668		
DROP participants - annuities		61,031,584		
Retired employees, contingent annuitants and spouses receiving benefits		717,287,994		
Disabled members		87,907,808		
Inactive vested employees		2,232,217		
Inactive employees due refunds		227,842		
Total			$	1,599,509,251
Present value of future death benefits payable upon death of active members				9,080,805
Present value of future benefits payable upon termination of active members				5,882,557
Total Liabilities			$	1,614,472,613

EXHIBIT 4

UNFUNDED ACTUARIAL LIABILITY

As of January 1, 2018

The actuarial liability is the portion of the present value of future benefits which will not be paid by future normal costs. The actuarial value of assets is subtracted from the actuarial liability to determine the unfunded actuarial liability.

The City makes scheduled payments of $1,327,600 annually through the year 2028 in addition to the payroll related contributions. The present value of these contributions was applied to the Unfunded Actuarial Liability (UAL) to determine the amount of the UAL to be funded as a percent of payroll (contribution rates).

1.	Present Value of Future Benefits	$	1,614,472,613
2.	Present Value of Future Normal Costs		259,043,076
3.	Actuarial Liability (1) – (2)		1,355,429,537
4.	Actuarial Value of Assets		706,595,615
5.	Unfunded Actuarial Liability (3) – (4)		648,833,922
6.	Present Value of Prior Service Payments		9,958,543
7.	Adjusted Unfunded Actuarial Liability (Payable from Payroll Related Contributions) (5) – (6)	$	638,875,379

EXHIBIT 5

CALCULATION OF ACTUARIAL GAIN / (LOSS)
For Plan Year Ending December 31, 2017

Liabilities

1.	Actuarial liability less prior service payments as of January 1, 2017	$ 1,257,511,781
2.	Normal cost for 2017	27,892,194
3.	Interest at 8.00% on (1) and (2) to December 31, 2017	102,832,318
4.	Benefit payments during 2017	(75,783,117)
5.	Interest on benefit payments	(2,973,008)
6.	Impact of assumption changes*	40,910,110
7.	Expected actuarial liability as of December 31, 2017	$ 1,350,390,278
8.	Actuarial liability less prior service payments as of December 31, 2017	$ 1,345,470,994

Assets

9.	Actuarial value of assets as of January 1, 2017	$ 656,171,797
10.	Contributions during 2017	68,366,987
11.	Benefit payments during 2017	(75,783,117)
12.	Interest on items (9), (10) and (11)	52,202,805
13.	Expected actuarial value of assets as of December 31, 2017	$ 700,958,472
14.	Actual actuarial value of assets as of December 31, 2017	$ 706,595,615

Gain / (Loss)

15.	Expected unfunded actuarial liability (7) – (13)	$ 649,431,806
16.	Actual unfunded actuarial liability (8) – (14)	$ 638,875,379
17.	Actuarial Gain / (Loss) (15) – (16)	$ 10,556,427
18.	Actuarial Gain / (Loss) on Actuarial Assets (14) – (13)	$ 5,637,143
19.	Actuarial Gain / (Loss) on Actuarial Liability (7) – (8)	$ 4,919,284

* $41,019,150 prior to reflecting the impact that the change to the investment return assumption had on the present value of prior service payments.

EXHIBIT 6

ANALYSIS OF EXPERIENCE

The purpose of conducting an actuarial valuation of a retirement plan is to estimate the costs and liabilities for the benefits expected to be paid from the plan, to determine the annual level of contribution for the current plan year that should be made to support these benefits and, finally, to analyze the plan's experience. The costs and liabilities of this retirement plan depend not only upon the benefit formula and plan provisions but also upon factors such as the investment return on the Fund, mortality rates among active and retired members, withdrawal and retirement rates among active members, rates at which salaries increase and the rate at which the cost of living increases.

The actuarial assumptions employed as to these and other contingencies in the current valuation are set forth in Appendix B of this report.

Since the overall results of the valuation will reflect the choice of assumptions made, periodic studies of the various components of the plan's experience are conducted in which the experience for each component is analyzed in relation to the assumption used for that component (called an experience study). This summary is not intended to be an actual "experience study" but rather an analysis of sources of gain and loss in the past plan year.

Gain/(Loss) By Source

The System experienced a net actuarial gain on liabilities of $4.9 million during the plan year ended December 31, 2017, and an actuarial gain on assets of $5.6 million. The net actuarial gain was $10.5 million. The major components of this net actuarial experience loss are shown below:

Liability Sources	Gain/(Loss)	
Salary Increases	$	3,909,000
Mortality		628,000
Terminations		1,390,000
Retirements/DROP		(2,545,000)
Disability		1,189,000
New Entrants/Rehires		(270,000)
Miscellaneous		618,000
Total Liability Gain/(Loss)	$	4,919,000
Asset Gain/(Loss)	$	5,637,000
Net Actuarial Gain/(Loss)	$	10,556,000

EXHIBIT 7

SCHEDULE OF AMORTIZATION BASES

The System amortizes the unfunded actuarial liability (UAL) using a "layered" approach for the UAL where the UAL as of January 1, 2018 (legacy UAL) is amortized over a closed amortization period of 26 years. Changes to the UAL resulting from changes in the set of actuarial assumptions are amortized over an appropriate period, as determined by the Board of Trustees in consultation with the actuary. Changes to the UAL in subsequent years that result from actual experience that is different than expected, based on the actuarial assumptions, are set up as a new amortization base with payments determined as a level-percent of pay over a closed 20-year period beginning on that valuation date. The total UAL payment is the sum of the amortization payments on each of the amortization bases.

Amortization Bases	Original Amount	January 1, 2018 Remaining Years	Year of Last Payment	Outstanding Balance as of January 1, 2018	Annual Contribution (mid-year)
2018 Legacy UAL	$ 638,875,379	26	2043	$ 638,875,379	$ 41,327,212
Total				$ 638,875,379	$ 41,327,212

EXHIBIT 8

**DEVELOPMENT OF
2018 ACTUARIAL CONTRIBUTION RATE**

The actuarial cost method used to determine the required level of annual contributions to support the expected benefits is the Entry Age Normal Cost Method. Under this method, the total cost is comprised of the normal cost rate and the unfunded actuarial liability (UAL) payment. The System is financed by contributions from the employees and the City.

1.	Normal Cost During 2018	
	a. Retirement	$ 23,975,680
	b. Disability	3,279,319
	c. Pre-retirement death	718,839
	d. Termination	885,473
	e. Total	$ 28,859,311
2.	Expected Payroll in 2018 for Current Actives	$ 129,934,191
3.	Normal Cost Rate (1e) / (2)	22.211%
4.	Unfunded Actuarial Liability Payable from Payroll Related Contributions	$ 638,875,379
5.	Unfunded Actuarial Liability (UAL) Payment	$ 41,327,212
6.	Prior Service Payment	1,327,600
7.	Total Projected Payroll for 2018, Including DROP Members	$ 137,647,929
8.	UAL and Prior Service Payment as a Percent of Pay [(5) + (6)] / (7)	30.988%
9.	Total Actuarial Contribution Rate (1e) + (8)	53.199%
10.	Employee Contribution Rate	16.573%
11.	City Ordinance Contribution Rate	33.750%
12.	City Prior Service Contribution Rate	0.964%
13.	Contribution (Shortfall)/Margin (10) + (11) + (12) - (9)	(1.912%)

SECTION II

OTHER INFORMATION

In this section, we provide some historical information regarding the funding progress of the System. These exhibits retain some of the information that used to be required for accounting purposes and are included because they provide relevant information on the System's historical funding.

EXHIBIT 9

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ending	Annual Required Contribution* (a)	Total Employer Contribution* (b)	Percentage of ARC Contributed (b) / (a)
12/31/2005	$ 26,255,804	$ 17,762,209	67.65%
12/31/2006	31,102,053	20,171,610	64.86%
12/31/2007	34,842,280	20,699,211	59.41%
12/31/2008	38,073,021	21,700,806	57.00%
12/31/2009	50,507,561	22,701,608	44.95%
12/31/2010	55,488,062	24,183,493	43.58%
12/31/2011	49,945,979	30,775,568	61.62%
12/31/2012	54,310,693	35,302,037	65.00%
12/31/2013	52,895,180	43,838,750	82.88%
12/31/2014	43,524,890	41,851,986	96.16%
12/31/2015	41,910,737	42,138,403	100.54%
12/31/2016	42,468,180	43,235,242	101.81%
12/31/2017	45,939,660	46,608,741	101.46%

*Information prior to 2011 was provided by the prior actuary and has not been reviewed or verified by Cavanaugh Macdonald Consulting.

EXHIBIT 10

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date[1]	Actuarial Value of Assets (a)	Actuarial Liability (AL) (b)	Unfunded AL (UAL)[2] (b-a)	Funded Ratio (a / b)	Covered Payroll (P / R)[3] (c)	UAL as a Percentage of Covered P / R [(b-a) / c]
12/31/2005	$453,300,000	$ 703,800,000	$250,500,000	64.4%	$ 86,800,000	288.6%
12/31/2006	507,600,000	801,100,000	293,500,000	63.4%	91,700,000	320.1%
12/31/2007	530,800,000	882,700,000	351,900,000	60.1%	99,600,000	353.3%
12/31/2008	365,900,000	947,600,000	581,700,000	38.6%	99,500,000	584.6%
12/31/2009	405,400,000	1,026,200,000	620,800,000	39.5%	103,900,000	597.5%
12/31/2010	452,600,000	1,093,300,000	640,700,000	41.4%	111,200,000	576.2%
1/1/2011	456,158,774	1,028,866,353	572,707,579	44.3%	105,025,610	545.3%
1/1/2012	467,375,458	1,077,607,299	610,231,841	43.4%	110,027,537	554.6%
1/1/2013	495,847,234	1,108,874,778	613,027,544	44.7%	116,056,740	528.2%
1/1/2014	548,360,223	1,170,967,753	622,607,530	46.8%	124,051,668	501.9%
1/1/2015	590,191,585	1,189,002,221	598,810,636	49.6%	126,843,763	472.1%
1/1/2016	621,403,975	1,223,966,110	602,562,135	50.8%	129,633,658	464.8%
1/1/2017	656,171,797	1,267,909,175	611,737,378	51.8%	133,044,481	459.8%
1/1/2018	706,595,615	1,355,429,537	648,833,922	52.1%	137,647,929	471.4%

1. Results prior to 2011 were provided by the prior actuary and were reported at the end of the year rather than the valuation date. All information prior to 2011 in this exhibit was provided by the prior actuary and has not been reviewed or verified by Cavanaugh Macdonald Consulting, LLC.
2. As of 1/1/2011, the Unfunded AL is not reduced by the Present Value of Prior Service Payments. For the calculation of the Unfunded AL used for funding purposes, please refer to Exhibit 4 of this report.
3. As of 1/1/2014, covered payroll includes DROP participants' pay.

APPENDIX A

SUMMARY OF PLAN PROVISIONS

Average Final Monthly Compensation:
Section 22 - 63

Police: Pensionable pay excludes certain overtime pay. For those hired before January 1, 2010, an adjustment is made to include a career average of overtime pay. For those who were age 45 and had at least 20 years of service as of January 1, 2010, highest average monthly compensation is calculated using the highest consecutive twenty-six (26) pay periods out of the last five years of service as a member of the system for which service credit had been earned. All others use the highest seventy-eight (78) pay periods of the final 130 pay periods of service.

Fire: For members who were age 45 and had at least 25 years of service or age 50 with at least 20 years of service as of January 1, 2013, highest average monthly compensation during any consecutive twenty-six (26) pay periods out of the last five years of service as a member of the system for which service credit had been earned. All others use the highest seventy-eight (78) pay periods with the final 130 pay periods of service.

Career Overtime Average (COTA):

All Members: Each hour an employee earns for overtime is computed back to their date of hire or 1991 (whichever is later) and divided by the number of years the employee worked after December 31, 1990. This amount shall be included in the member's pension calculation. COTA is excluded for all Police members hired on or after January 1, 2010 and Fire members hired on or after January 1, 2013.

Member Contributions:
Section 22 – 73(a)
Section 22 - 68

Police: 16.10% of each member's pensionable earnings for contract years 2018-2020, 15.35% thereafter.
Fire: 17.15% of each member's pensionable earnings.

City of Omaha Contributions:
Section 22 – 73(b)

Police: 34.420% of each member's pensionable earnings for contract years 2018-2020, 33.670% thereafter.
Fire: 32.965% of each member's pensionable earnings.

In addition, the City shall make contributions of $1,327,600 annually through the year 2028.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Service Retirement Eligibility
Section 22 - 75

<u>Police:</u> After age 55 and 10 years of service or age 45 and 20 years of service. Members hired after January 1, 2010 must be 50 rather than 45. If retiring with less than 30 years of service a 7% reduction is applied for each year prior to age 55.

<u>Fire:</u> Age 55 and 10 years of service or age 50 and 20 years of service. Members hired before 1/1/2013 can also retire at age 45 if they have at least 25 years of service.

Service Retirement Pension
Section 22 - 76

For Police with at least 20 years of service as of September 19, 2010 and Fire members with at least 15 years of service as of January 2, 2013, the following schedule applies.

Years of Service	Minimum Age	Percentage of Average Final Monthly Compensation
10 but less than 15	55	20%
15 but less than 20	55	30%
20 but less than 25	45**	55%*
25 years	45	75%

*55% at 20 years of service, plus 2% for each additional six months of service after 20 years and before 25 years.

** The minimum retirement age with less than 25 years is 50 for Fire.

For Police who did not have 20 years of service as of September 19, 2010 and Fire who did not have 15 years of service as of January 2, 2013, the following schedule applies:

Years of Service	Minimum Age	Percentage of Average Final Monthly Compensation
10 but less than 15	55	20%
15 but less than 20	55	30%
20 but less than 25	45***	50%*
25 but less than 30	45	70%**
30 years	45	75%

*50% at 20 years of service, plus 2% for each additional six months of service after 20 years and before 25 years.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

**70% at 25 years of service, plus 1% for each additional six months of service after 25 years and before 27 years, with an additional 0.5% 29 and 30 years, for a maximum of 75%.

*** The minimum retirement age with less than 25 years is 50 for Fire.

For police hired after January 1, 2010, the following schedule applies:

Years of Service	Minimum Age	Percentage of Average Final Monthly Compensation
10 but less than 15	55	20%
15 but less than 20	55	30%
20 but less than 25	50	50%*
25 but less than 30	50	65%**
30 years	50	75%

*50% at 20 years of service, plus 1.5% for each additional six months of service after 20 years and before 25 years. Early retirement reduction applies if less than 30 years of service.

**65% at 25 years of service, plus 1% for each additional six months of service after 25 years and before 30 years. Early retirement reduction applies if less than 30 years of service.

For Fire hired after January 1, 2013, the following schedule applies:

Years of Service	Minimum Age	Percentage of Average Final Monthly Compensation
10 but less than 15	55	20%
15 but less than 20	55	30%
20 but less than 25	50	45%
25 but less than 30	50	55%*
30 years	50	65%

*55% at 25 years of service, plus 2% for each additional year of service after 25 years and before 30 years. Early retirement reduction applies if under age 55, unless the member has 30 years of service.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Cost of Living Adjustment (COLA):

The monthly pension shall be increased by the lesser of 3% or $50 ($65 for Fire retirements after June 30, 2007). The increase will be made annually, beginning in the 13th month of retirement.

Deferred Retirement Option Program (DROP):

Members may participate in the DROP for three to five years once they reach retirement eligibility with a minimum of 25 years of service. Members continue to make contributions to the system during the DROP period. During the DROP period, the member is credited with the benefits that would have been paid if the member had retired at the start of the DROP period, along with interest at the end of the year. At the end of the DROP period, the member ends employment, receives the DROP account balance, and begins to receive payments as though retirement had occurred at the beginning of the DROP period.

Disability Retirement

1.   In Line of Duty
Section 22 - 78

A member shall become entitled to the following benefits while permanently disabled.

Years of Service	Percentage of Average Final Monthly Compensation
Less than 20	50%
20 or more	Same as Service Retirement Pension, without any reduction for early commencement

2.   Not in Line of Duty
Section 22 - 79

A member shall become entitled to the following benefits while permanently disabled.

Years of Service	Percentage of Average Final Monthly Compensation
Up to 10 years	10%
10 but less than 15	20%
15 but less than 20	30%
20 or more	Greater of 45% or the Service Retirement Pension without any reduction for early commencement

Note: Not payable while full salary continues

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Spouse's pension:

1. **Death of Active member in Line of Duty:**

A monthly pension equal to 49% (52% Fire members who were age 45 and had at least 25 years of service or age 50 with at least 20 years of service as of most recent contract date) of the member's average final monthly compensation is paid to the surviving spouse if death occurs while the active member has less than 25 years of service. A monthly pension equal to 69% (72% Fire members who were age 45 and had at least 25 years of service or age 50 with at least 20 years of service as of most recent contract date) of the member's average final monthly compensation is paid to the surviving spouse if death occurs after the active member has 25 years or more of service.

2. **Death of Active member Not in Line of Duty:**

The following monthly pension is paid to the surviving spouse.

Years of Service at Death	Percentage of Average Final Monthly Compensation*
0-3	0.0%
3-10	35.0%
11	36.4%
12	37.8%
13	39.2%
14	40.6%
15	42.0%
16	43.4%
17	44.8%
18	46.2%
19	47.6%
20-25	49.0%
25+	69.0%

* add 3% to each number for Fire members who were age 45 and had at least 25 years of service or age 50 with at least 20 years of service as of most recent contract date

Note: Benefit terminates upon remarriage of spouse.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

3. **Death of Member Eligible for Retirement or Death of Retired Member:**
Section 22 - 82

<u>Police:</u> 75% of the pension the member was receiving or was eligible to receive at the time of death. 50% of the pension the member was receiving or was eligible to receive for Police members hired after January 1, 2010. Upon spouse's remarriage, all benefits cease.

<u>Fire:</u> 75% of the pension the member was receiving at the time of death for Fire members who began receiving benefits before July 1, 2007. 90% of the pension the member was receiving or was eligible to receive at the time of death for Fire members who were hired before January 1, 2013 and were not receiving benefits before July 1, 2007. 50% of the pension the member was receiving or was eligible to receive for Fire members hired after January 1, 2013. Upon spouse's remarriage, all benefits cease.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Children's Pension
Section 22 - 82

Upon the death of an active or retired member, the following benefit will be paid to the surviving children until age 18.

Number of Dependent Children	Percentage of Average Final Monthly Compensation
1	15%
2	30%
3	45%
4 or more	50%

Lump Sum Death Benefits

1. **Active Member without Eligible Dependents:**
Section 22 – 84(a)

Accumulated member's contributions, or $500 if greater.

2. **Retired Member without Eligible Dependents:**
Section 22 – 84(b)

Accumulated member's contributions, less previous pension payments made, or $500 if greater.

3. **Active Member with Eligible Dependents:**
Section 22 – 84(c)

An amount payable immediately, equal to one year's salary computed on the basis of the maximum monthly rate for patrolmen and firefighters, plus the decreased member's accumulated contributions less pension payments to his dependents, payable to the dependent who last ceases to receive pension benefits.

4. **Retired Member with Eligible Dependents:**
Section 22 – 84(c)

$1,000 ($5,000 for Fire retirements after June 30, 2005) payable immediately, plus the excess over $1,000 ($5,000 for Fire retirements after June 30, 2005) if any, of the deceased member's accumulated contributions less pension payments to the member and his dependents, payable to the dependent who last ceases to receive pension benefits.

APPENDIX A

SUMMARY OF PLAN PROVISIONS
(continued)

Vesting:

Section 22 - 86

Upon severance of employment by a member with less than 10 years of service and prior to obtaining eligibility under Section 22 – 75, a refund of such member's accumulated contributions.

Section 22 - 86

Upon severance of employment by a member before age 45 with more than 10 years of service and prior to obtaining eligibility under Section 22 – 75, the member may elect, in lieu of receiving a refund of contributions, to receive a monthly pension, according to the table below, commencing at age 55. Such deferred pension shall be based on service credited to the date of severance.

Years of Service	Minimum Age	Percentage of Average Final Monthly Compensation
10 but less than 15	55	20%
15 but less than 20	55	30%
20 but less than 25	50	55%
25 or more	45	75%

For Police members with less than 15 years of service as of September 19, 2010 and Fire members with less than 15 years of service as of January 2, 2013, the schedules shown under service retirement apply as appropriate.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Cost Method

Valuations of the plan use the *"entry age-normal"* cost method. Under this actuarial method, the value of future costs attributable to future employment of participants is determined. This is called <u>present value of future normal costs.</u> The following steps indicate how this is determined for benefits expected to be paid upon normal retirement or the end of the Deferred Retirement Option Plan (DROP).

1. The expected pension benefit payable at the end of the employee's period in covered employment (later of normal retirement or the end of the DROP, is applicable) is determined for each participant.

2. A <u>normal cost,</u> as a level percent of pay, is determined for each participant assuming that such level percent is paid from the employee's entry age into employment to the end of his covered employment. This normal cost is determined so that its accumulated value at the end of covered employment is sufficient to provide the expected pension benefits.

3. The sum of the normal costs for all participants for one year determines the total normal cost of the plan for one year.

4. The value of future payments of normal cost in future years is determined for each participant based on his years of service to the end of covered employment.

5. The sum of the value of future payments of normal cost for all participants determines the present value of future normal costs.

The value of future costs attributable to past employment of participants, which is called the actuarial liability, is equal to the present value of benefits less the present value of future normal costs. The unfunded actuarial liability is equal to the excess of the actuarial liability over assets.

As experience develops with the plan, actuarial gains and actuarial losses result. These actuarial gains and losses indicate the extent to which actual experience is deviating from that expected on the basis of the actuarial assumptions. In each year, as they occur, actuarial gains and losses are recognized in the unfunded actuarial liability as of the valuation date.

Actuarial Value of Assets

The actuarial value of assets is equal to the expected asset value (based on last year's actuarial value of assets, net cash flows and a rate of return equal to the actuarial assumed rate of 8.0%) plus 1/4 of the difference between the actual market value and the expected asset value. The actuarial value of assets cannot exceed 120% or fall below 80% of the market value of assets.

Unfunded Actuarial Liability Amortization Method

Beginning with the 2018 valuation, the UAL will be amortized using a "layered" approach. Under this method, the UAL as of January 1, 2018 will continue to be amortized according to the current schedule (26 years remain as of January 1, 2018). Any new UAL generated as a result of actuarial experience in subsequent years will be "layered" and amortized as a level-percent of pay over a closed 20-year period.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

Investment Return:	7.75% per year, (net of investment expenses)
Inflation:	2.50%
Payroll Growth:	3.25%
Salary Increases:	Merit increases based on service plus a general wage increase
Service Retirement Age:	Graduated rates based on service

Mortality:

Active Members	RP-2000 Employee Table projected with generational improvements using Scale AA, set forward one year
Service Pensioners and Beneficiaries	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward one year
Disabled	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward five years

Disability:	Graduated Rates by age. See table on next page
Percent of Disabilities in Line of Duty:	85%
Medical Expenses for Disabilities in Line of Duty:	5% load on liability for current and future disabled members.
Percent Married at Death or Retirement:	75%
Spouse Age Difference:	Husbands assumed to be 3 years older than wives
Turnover:	Graduated rates by age. See table on next page
COTA Adjustment:	Members are assumed to retire with their current COTA
Decrement Timing:	Middle of year

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

SAMPLE RATES Annual Rates		
Age on 1/1/2010	Mortality	
	Males	Females
20	0.03%	0.02%
30	0.05	0.03
40	0.10	0.07
50	0.19	0.15
60	0.46	0.41

SAMPLE RATES Annual Rates	
Current Age	Disability
20	0.17%
30	0.19
40	0.33
50	0.61
60	0.92

SAMPLE RATES Annual Rates		
Years of Service	Turnover	
	Police	Fire
1	3.0%	1.5%
5	1.8	0.5
10	0.8	0.5
15	0.8	0.5
20	0.0	0.0

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

SAMPLE RATES Salary Progression – Police				
Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.75%	10.00%	13.25%
5	2.50%	0.75%	4.00%	7.25%
10	2.50%	0.75%	1.20%	4.45%
15	2.50%	0.75%	0.50%	3.75%
20	2.50%	0.75%	0.50%	3.75%
25	2.50%	0.75%	0.00%	3.25%

SAMPLE RATES Salary Progression – Fire				
Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.75%	5.00%	8.25%
5	2.50%	0.75%	4.50%	7.75%
10	2.50%	0.75%	1.00%	4.25%
15	2.50%	0.75%	1.00%	4.25%
20	2.50%	0.75%	0.00%	3.25%

Assumed retirement rates for Police members hired <u>before</u> January 1, 2010 and Fire members hired <u>before</u> January 1, 2013 are as follows:

SAMPLE RATES Annual Rates		
Years of Service	Retirement	
	Police	Fire
20	3%	15%
21	3	15
22	10	15
23	10	15
24	10	15
25	100	100

If a member has years of service listed above, but is age 62 or older, they are assumed to retire immediately.

APPENDIX B

ACTUARIAL METHODS AND ASSUMPTIONS
(continued)

Assumed retirement rates for Police members hired <u>after</u> January 1, 2010 and Fire members hired <u>after</u> January 1, 2013 are the earlier of **Age 50 and 30 Years of Service** or **Age 55 and 10 Years of Service**.

DROP Participation Rate: 75% of retirement-eligible members are assumed to enter DROP

DROP Period: 5 years, but not beyond age 60

Interest Credited to DROP Accounts: 4% annually

MEMBERSHIP DATA FOR VALUATION

The summary of member characteristics presented below covers the member group as of January 1, 2018. The schedules at the end of the report show the distribution of the various member groups by present age along with other pertinent data.

Total number of members in valuation:

(a)	Active members	1,446
(b)	DROP members	63
(c)	Inactive vested members	11
(d)	Terminated members due a refund	11
(e)	Disabled members	223
(f)	Retirees, spouses and children receiving benefits	1,262
(g)	Total	3,016

Average age of members in valuation:

(a)	Active members	
	Attained Age	41.3
	Hire Age	28.7
(b)	DROP members	53.6
(c)	Inactive vested members	46.6
(d)	Disabled members	67.5
(e)	Retired members	66.1
(f)	Spouses and children receiving benefits	70.7

Active members as of January 1, 2018:

(a)	Eligible for vested benefits	775
(b)	Eligible for early or normal retirement benefits	226
(c)	Eligible for refund of contributions only (not vested)	445
(d)	Total	1,446

MEMBERSHIP DATA RECONCILIATION
January 1, 2017 to January 1, 2018

The number of members included in the valuation, as summarized in the table below, is in accordance with the data submitted by the City for eligible employees as of the valuation date.

	Active Members	Termination Refund Due	Inactive Vested	Disabled Members	DROP Members	Retirees	Beneficiaries	Total
Total Members 1/1/2017	1,424	7	13	225	57	984	279	2,989
New Members	70	3	0	0	0	0	0	73
Terminations								
Rehired	1	(1)	0	0	0	0	0	0
Refunded: Paid	(9)	(2)	(2)	0	0	0	0	(13)
Refunded: Due	(4)	4	0	0	0	0	0	0
Inactive Vested	(2)	0	2	0	0	0	0	0
Disabled	(2)	0	0	2	0	0	0	0
Retirements	(13)	0	(1)	0	(13)	27	0	0
Participating in DROP	(19)	0	0	0	19	0	0	0
Benefit Payments Ended	0	0	0	0	0	0	0	0
Data Adjustments	0	0	(1)	3	0	(2)	(8)	(8)
Deaths								
With Beneficiary	0	0	0	(2)	0	(11)	13	0
Without Beneficiary	0	0	0	(5)	0	(6)	(14)	(25)
Total Members 1/1/2018	1,446	11	11	223	63	992	270	3,016

SCHEDULE I

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Total

Age	Count of Members			Valuation Salaries of Members		
	Males	Females	Total	Males	Females	Total
Under 25	16	3	19	$ 781,845	$ 103,743	$ 885,588
25-29	97	11	108	6,153,910	647,627	6,801,537
30-34	177	22	199	13,605,992	1,628,856	15,234,848
35-39	240	29	269	21,198,478	2,587,621	23,786,099
40-44	245	42	287	23,473,558	3,795,709	27,269,267
45-49	287	44	331	29,149,254	4,502,128	33,651,382
50-54	159	15	174	16,452,101	1,584,369	18,036,470
55-59	49	5	54	4,986,035	574,638	5,560,673
60-64	5	0	5	471,195	0	471,195
Over 64	0	0	0	0	0	0
Total	1,275	171	1,446	$116,272,368	$15,424,691	$131,697,059
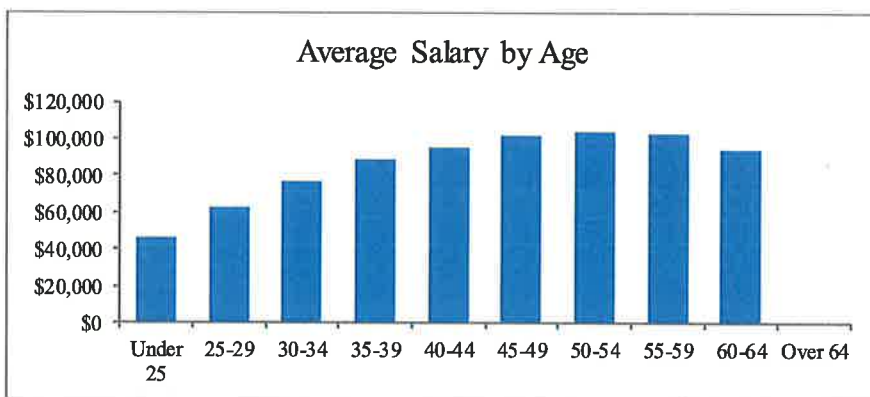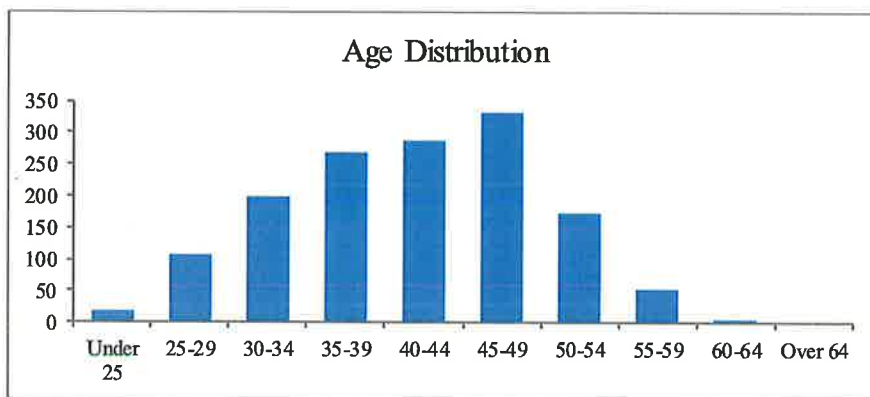
Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Total

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	19	0	0	0	0	0	0	0	0	19
25-29	84	24	0	0	0	0	0	0	0	108
30-34	68	81	50	0	0	0	0	0	0	199
35-39	35	65	153	16	0	0	0	0	0	269
40-44	16	34	97	122	18	0	0	0	0	287
45-49	5	12	59	145	104	6	0	0	0	331
50-54	1	1	20	55	81	16	0	0	0	174
55-59	0	0	7	19	25	3	0	0	0	54
60-64	0	0	2	0	2	1	0	0	0	5
Over 64	0	0	0	0	0	0	0	0	0	0
Total	228	217	388	357	230	26	0	0	0	1,446

Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

All Police Members

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	9	3	12	$ 343,609	$ 103,743	$ 447,352
25-29	62	8	70	3,548,326	458,384	4,006,710
30-34	123	19	142	8,957,313	1,384,183	10,341,496
35-39	136	21	157	11,847,965	1,872,100	13,720,065
40-44	113	34	147	10,631,251	3,041,096	13,672,347
45-49	139	37	176	14,096,487	3,712,091	17,808,578
50-54	71	13	84	7,197,442	1,356,715	8,554,157
55-59	18	4	22	1,735,049	457,623	2,192,672
60-64	3	0	3	291,735	0	291,735
Over 64	0	0	0	0	0	0
Total	674	139	813	$58,649,177	$12,385,935	$71,035,112

Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

All Police Members

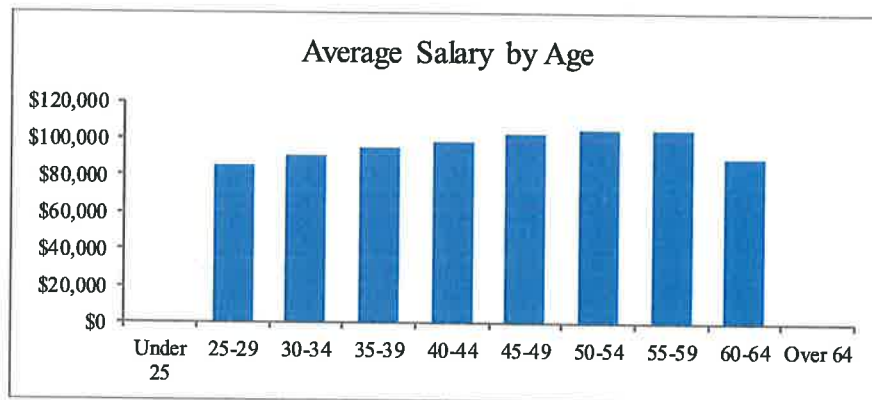| Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	12	0	0	0	0	0	0	0	0	12
25-29	68	2	0	0	0	0	0	0	0	70
30-34	62	48	32	0	0	0	0	0	0	142
35-39	24	32	91	10	0	0	0	0	0	157
40-44	14	19	52	54	8	0	0	0	0	147
45-49	4	6	31	68	64	3	0	0	0	176
50-54	1	1	8	26	37	11	0	0	0	84
55-59	0	0	1	10	6	1	0	0	0	22
60-64	0	0	0	0	1	1	0	0	0	3
Over 64	0	0	0	0	0	0	0	0	0	0
Total	185	108	220	168	116	16	0	0	0	813
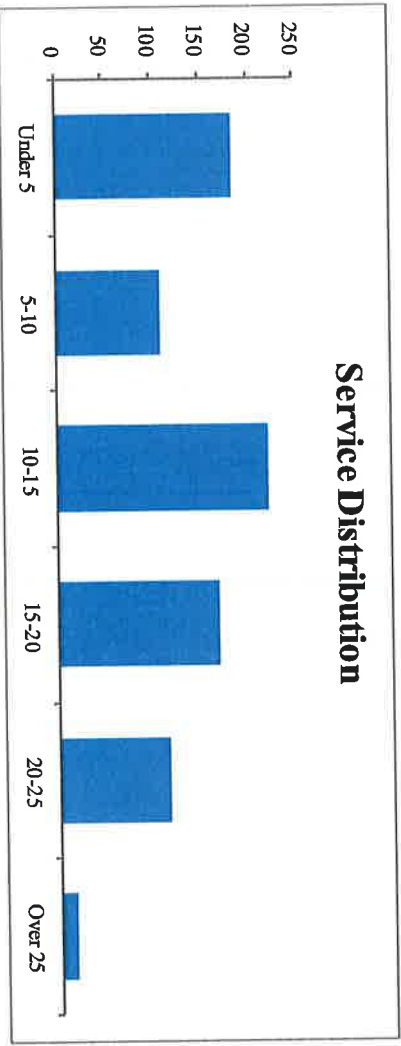
Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Police Members Hired Before January 1, 2010

Age	Count of Members			Valuation Salaries of Members		
	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25-29	0	0	0	0	0	0
30-34	45	5	50	4,158,425	448,878	4,607,303
35-39	97	17	114	9,309,645	1,561,197	10,870,842
40-44	91	30	121	9,131,483	2,782,170	11,913,653
45-49	132	36	168	13,608,951	3,674,067	17,283,018
50-54	69	13	82	7,077,265	1,356,715	8,433,980
55-59	18	4	22	1,735,049	457,623	2,192,672
60-64	3	0	3	291,735	0	291,735
Over 64	0	0	0	0	0	0
Total	455	105	560	$45,312,553	$10,280,650	$55,593,203

Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Police Members Hired Before January 1, 2010

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
30-34	0	18	32	0	0	0	0	0	0	50
35-39	0	13	91	10	0	0	0	0	0	114
40-44	0	7	52	54	8	0	0	0	0	121
45-49	0	2	31	68	64	3	0	0	0	168
50-54	0	0	8	26	37	11	0	0	0	82
55-59	0	0	5	10	6	1	0	0	0	22
60-64	0	0	1	0	1	1	0	0	0	3
Over 64	0	0	0	0	0	0	0	0	0	0
Total	0	40	220	168	116	16	0	0	0	560

Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Police Members Hired On or After January 1, 2010

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	9	3	12	$ 343,609	$ 103,743	$ 447,352
25-29	62	8	70	3,548,326	458,384	4,006,710
30-34	78	14	92	4,798,888	935,305	5,734,193
35-39	39	4	43	2,538,320	310,903	2,849,223
40-44	22	4	26	1,499,768	258,926	1,758,694
45-49	7	1	8	487,536	38,024	525,560
50-54	2	0	2	120,177	0	120,177
55-59	0	0	0	0	0	0
60-64	0	0	0	0	0	0
Over 64	0	0	0	0	0	0
Total	219	34	253	$13,336,624	$2,105,285	$15,441,909
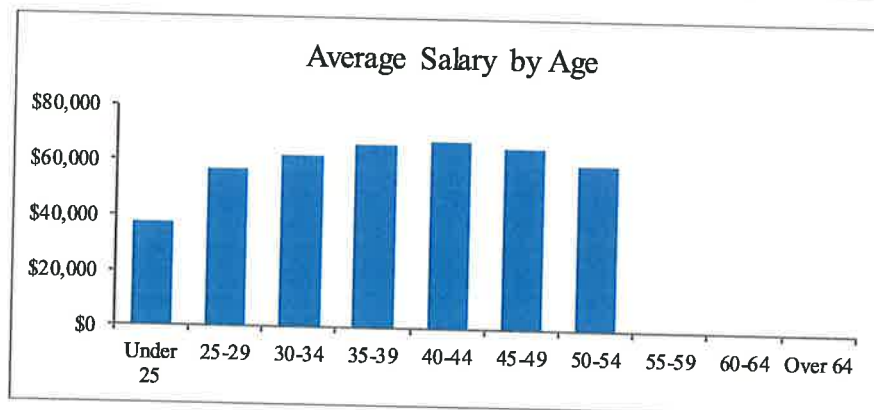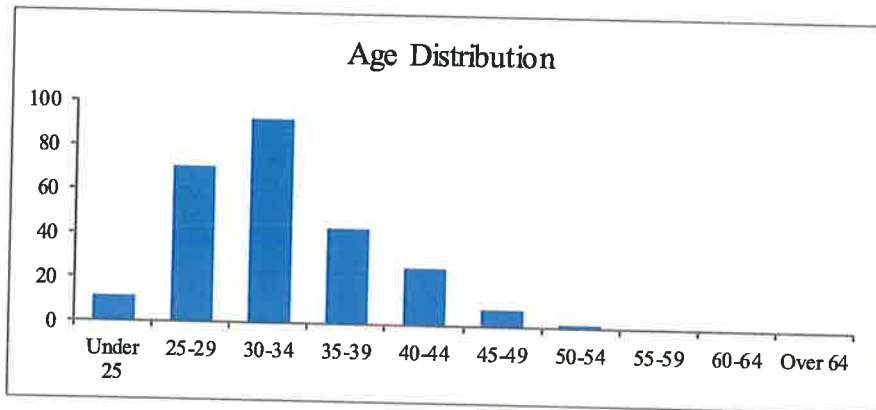
Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Police Members Hired On or After January 1, 2010

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	12	0	0	0	0	0	0	0	0	12
25-29	68	2	0	0	0	0	0	0	0	70
30-34	62	30	0	0	0	0	0	0	0	92
35-39	24	19	0	0	0	0	0	0	0	43
40-44	14	12	0	0	0	0	0	0	0	26
45-49	4	4	0	0	0	0	0	0	0	8
50-54	1	1	0	0	0	0	0	0	0	2
55-59	0	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0	0
Over 64	0	0	0	0	0	0	0	0	0	0
Total	185	68	0	0	0	0	0	0	0	253

Service Distribution
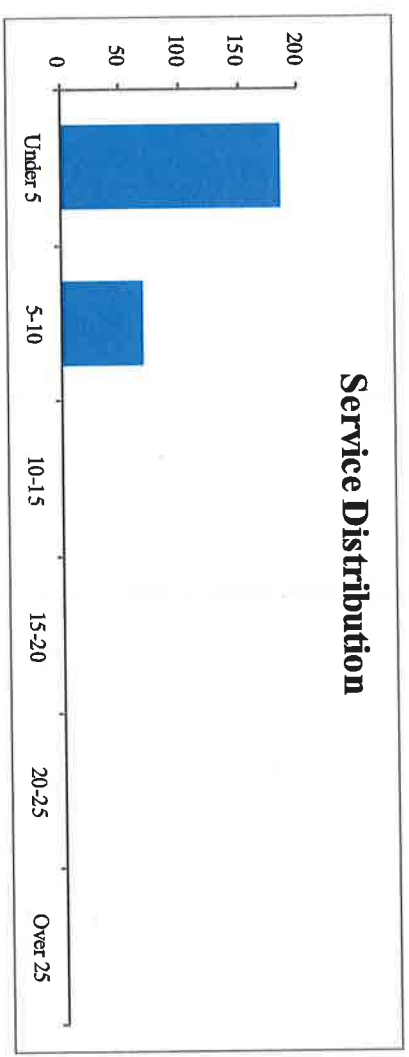
SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

All Fire Members

Age	Count of Members			Valuation Salaries of Members		
	Males	Females	Total	Males	Females	Total
Under 25	7	0	7	$ 438,236	$ 0	$ 438,236
25-29	35	3	38	2,605,584	189,243	2,794,827
30-34	54	3	57	4,648,679	244,673	4,893,352
35-39	104	8	112	9,350,513	715,521	10,066,034
40-44	132	8	140	12,842,307	754,613	13,596,920
45-49	148	7	155	15,052,767	790,037	15,842,804
50-54	88	2	90	9,254,659	227,654	9,482,313
55-59	31	1	32	3,250,986	117,015	3,368,001
60-64	2	0	2	179,460	0	179,460
Over 64	0	0	0	0	0	0
Total	601	32	633	$57,623,191	$3,038,756	$60,661,947

Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

All Fire Members

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	7	0	0	0	0	0	0	0	0	7
25-29	16	22	0	0	0	0	0	0	0	38
30-34	6	33	18	0	0	0	0	0	0	57
35-39	11	33	62	6	0	0	0	0	0	112
40-44	2	15	45	68	10	0	0	0	0	140
45-49	1	6	28	77	40	3	0	0	0	155
50-54	0	0	12	29	44	5	0	0	0	90
55-59	0	0	2	9	19	2	0	0	0	32
60-64	0	0	1	0	1	0	0	0	0	2
Over 64	0	0	0	0	0	0	0	0	0	0
Total	43	109	168	189	114	10	0	0	0	633

Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Fire Members Hired Before January 1, 2013

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25-29	7	0	7	596,236	0	596,236
30-34	40	2	42	3,645,094	185,803	3,830,897
35-39	84	5	89	7,933,069	490,231	8,423,300
40-44	124	8	132	12,261,407	754,613	13,016,020
45-49	145	7	152	14,830,695	790,037	15,620,732
50-54	88	2	90	9,254,659	227,654	9,482,313
55-59	31	1	32	3,250,986	117,015	3,368,001
60-64	2	0	2	179,460	0	179,460
Over 64	0	0	0	0	0	0
Total	521	25	546	$51,951,606	$2,565,353	$54,516,959

Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018
Fire Members Hired Before January 1, 2013

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	0	0	0	0	0	0	0	0	0	0
25-29	0	7	0	0	0	0	0	0	0	7
30-34	0	24	18	0	0	0	0	0	0	42
35-39	0	21	62	6	0	0	0	0	0	89
40-44	0	9	45	68	10	0	0	0	0	132
45-49	0	4	28	77	40	3	0	0	0	152
50-54	0	0	12	29	44	5	0	0	0	90
55-59	0	0	2	9	19	2	0	0	0	32
60-64	0	0	1	0	1	0	0	0	0	2
Over 64	0	0	0	0	0	0	0	0	0	0
Total	0	65	168	189	114	10	0	0	0	546

Service Distribution

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Fire Members Hired On or After January 1, 2013

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 25	7	0	7	$ 438,236	$ 0	$ 438,236
25-29	28	3	31	2,009,348	189,243	2,198,591
30-34	14	1	15	1,003,585	58,870	1,062,455
35-39	20	3	23	1,417,444	225,290	1,642,734
40-44	8	0	8	580,900	0	580,900
45-49	3	0	3	222,072	0	222,072
50-54	0	0	0	0	0	0
55-59	0	0	0	0	0	0
60-64	0	0	0	0	0	0
Over 64	0	0	0	0	0	0
Total	80	7	87	$5,671,585	$473,403	$6,144,988
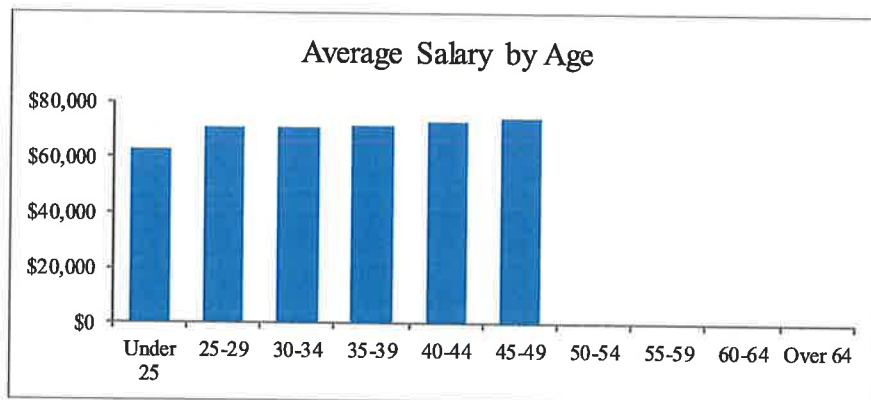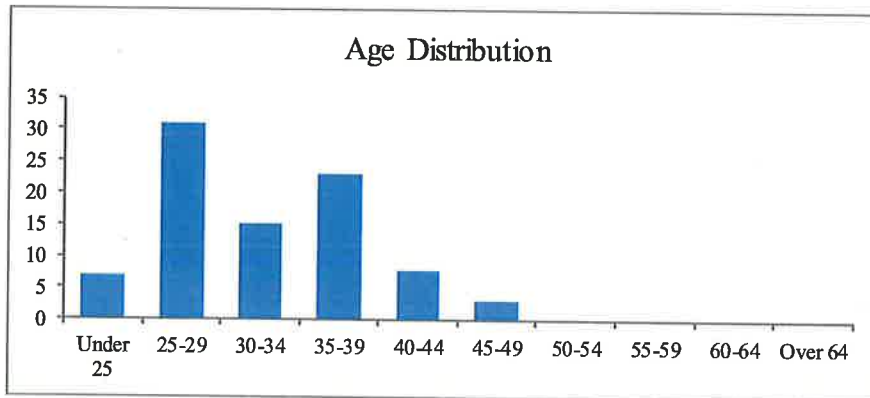
Age Distribution

Average Salary by Age

SCHEDULE I (continued)

ACTIVE MEMBERS AS OF JANUARY 1, 2018

Fire Members Hired On or After January 1, 2013

Age	Under 5	5-10	10-15	15-20	Service 20-25	25-30	30-35	35-40	Over 40	Total
Under 25	7	0	0	0	0	0	0	0	0	7
25-29	16	15	0	0	0	0	0	0	0	31
30-34	6	9	0	0	0	0	0	0	0	15
35-39	11	12	0	0	0	0	0	0	0	23
40-44	2	6	0	0	0	0	0	0	0	8
45-49	1	2	0	0	0	0	0	0	0	3
50-54	0	0	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0	0
Over 64	0	0	0	0	0	0	0	0	0	0
Total	43	44	0	0	0	0	0	0	0	87

Service Distribution
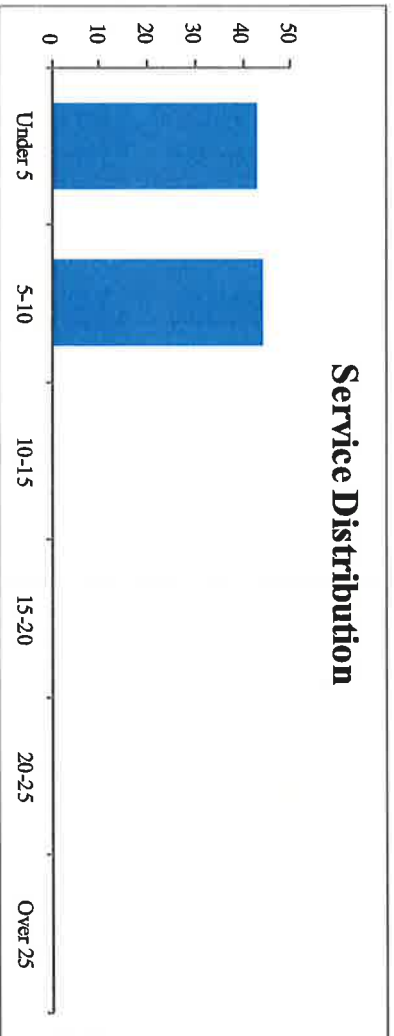
SCHEDULE II

DROP MEMBERS AS OF JANUARY 1, 2018

	Count of Members			Valuation Salaries of Members		
Age	Males	Females	Total	Males	Females	Total
Under 45	0	0	0	$ 0	$ 0	$ 0
45-47	0	1	1	0	110,236	110,236
48-50	11	1	12	1,128,102	95,450	1,223,552
51-53	17	4	21	1,622,765	440,468	2,063,233
54-56	15	1	16	1,202,762	86,208	1,288,970
57-59	12	0	12	1,163,282	0	1,163,282
Over 59	1	0	1	101,597	0	101,597
Total	56	7	63	$5,218,508	$732,362	$5,950,870

Age Distribution

Average Salary by Age
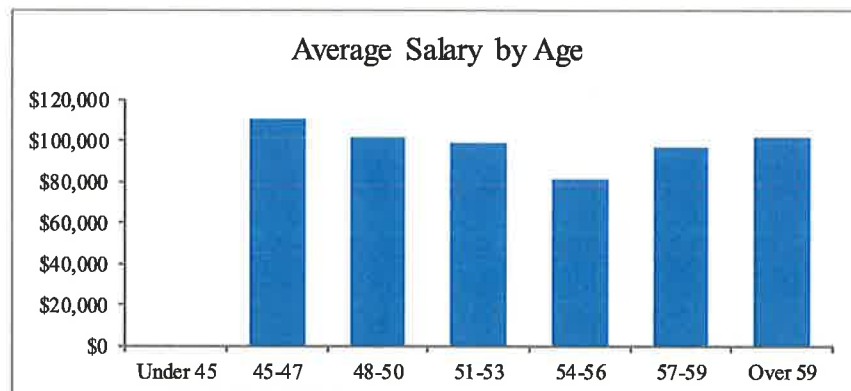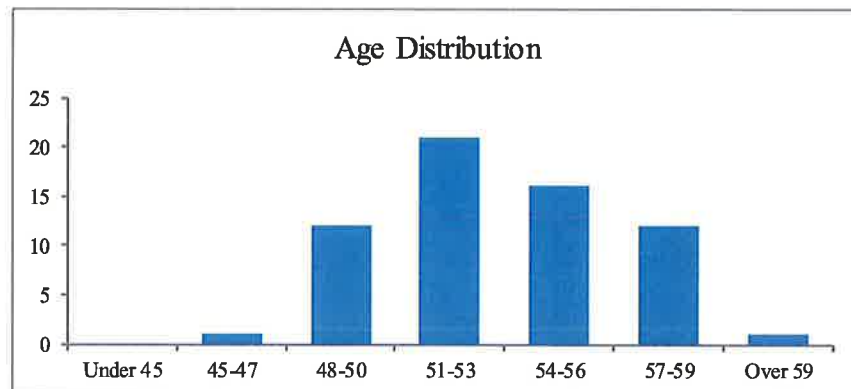
SCHEDULE III

RETIRED MEMBERS AS OF JANUARY 1, 2018

Age	Count of Retirees			Current Monthly Benefits		
	Males	Females	Total	Males	Females	Total
Under 60	243	39	282	$1,520,491	$193,809	$1,714,300
60-64	157	16	173	882,442	87,534	969,976
65-69	160	8	168	806,174	36,858	843,032
70-74	174	4	178	698,779	16,318	715,097
75-79	108	0	108	372,452	0	372,452
80-84	47	0	47	143,938	0	143,938
85-89	30	0	30	66,772	0	66,772
Over 89	6	0	6	7,614	0	7,614
Total	925	67	992	$4,498,662	$334,519	$4,833,181

Age Distribution

Average Benefit by Age
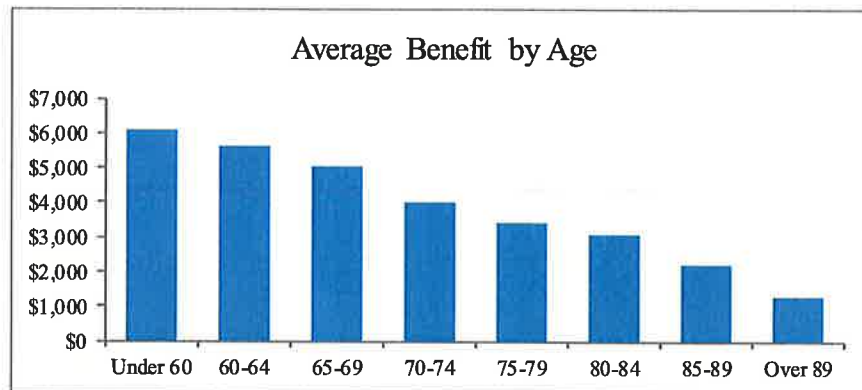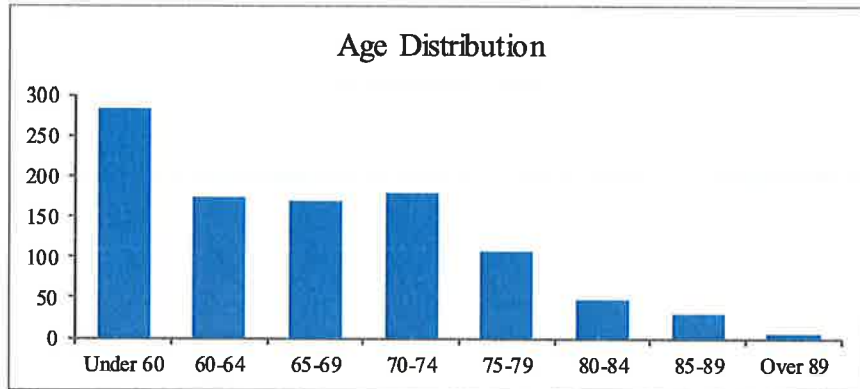
SCHEDULE IV

BENEFICIARIES RECEIVING BENEFITS AS OF JANUARY 1, 2018

	Count of Beneficiaries			Current Monthly Benefits		
Age	Males	Females	Total	Males	Females	Total
Under 60	12	37	49	$17,620	$ 85,740	$103,360
60-64	0	13	13	0	35,510	35,510
65-69	0	23	23	0	56,838	56,838
70-74	0	39	39	0	78,240	78,240
75-79	0	42	42	0	80,935	80,935
80-84	0	49	49	0	66,401	66,401
85-89	0	35	35	0	41,721	41,721
Over 89	0	20	20	0	18,254	18,254
Total	12	258	270	$17,620	$463,639	$481,259

Age Distribution

Average Benefit by Age
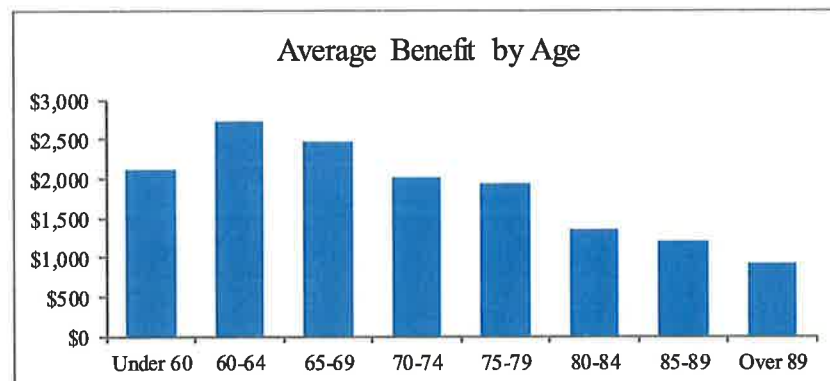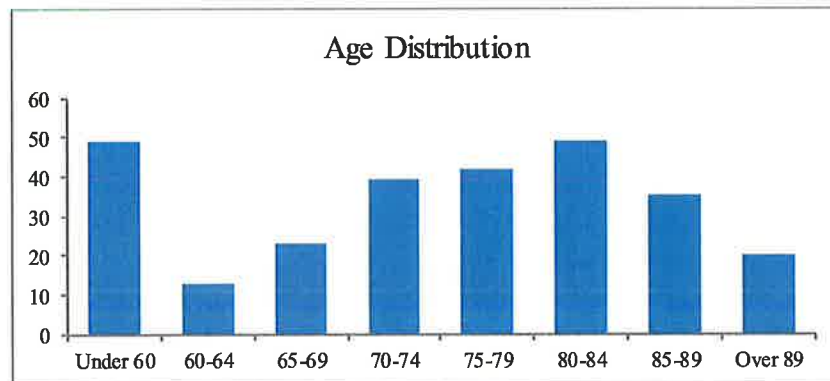
SCHEDULE V

INACTIVE VESTED MEMBERS AS OF JANUARY 1, 2018

	Count of Members			Expected Monthly Benefit		
Age	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	1	1	2	1,421	1,349	2,770
40-44	1	1	2	2,091	2,094	4,185
45-49	2	0	2	4,163	0	4,163
50-54	3	0	3	6,232	0	6,232
55-59	2	0	2	2,621	0	2,621
Over 59	0	0	0	0	0	0
Total	9	2	11	$16,528	$3,443	$19,971

SCHEDULE VI

DISABLED MEMBERS AS OF JANUARY 1, 2018

Age	Count of Members			Current Monthly Benefits		
	Males	Females	Total	Males	Females	Total
Under 30	0	0	0	$ 0	$ 0	$ 0
30-34	1	0	1	3,140	0	3,140
35-39	2	0	2	6,212	0	6,212
40-44	6	2	8	19,006	5,855	24,861
45-49	8	1	9	26,387	3,061	29,448
50-54	17	5	22	64,401	16,787	81,188
55-59	12	7	19	40,793	21,946	62,739
60-64	14	4	18	49,029	10,163	59,192
65-69	19	0	19	73,154	0	73,154
70-74	60	0	60	166,605	0	166,605
75-79	33	0	33	86,114	0	86,114
80-84	17	0	17	41,865	0	41,865
85-89	13	0	13	21,035	0	21,035
Over 89	2	0	2	2,465	0	2,465
Total	204	19	223	$600,206	$57,812	$658,018

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

March 15, 2018

Board of Trustees
City of Omaha Police and Fire Retirement System
1819 Farnam Street
Omaha, NE 68183

Dear Trustees:

It is a pleasure to submit this report of our investigation of the experience of the City of Omaha Police and Fire Retirement System (System) for the period of January 1, 2012 through December 31, 2015.

The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions to be used in the completion of the next actuarial valuation. In some cases, we recommend changes from the prior assumptions that are designed to better anticipate the emerging experience of the Plan. Actual future experience, however, may still differ from these assumptions.

In preparing this report, we relied without audit on information supplied by the City for the annual actuarial valuations. If any data or other information is inaccurate or incomplete, our analysis and recommendation may be impacted and a revised report may need to be issued.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* and No. 35, *Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations*

We look forward to our discussions and the opportunity to respond to your questions and comments.

I, Patrice A. Beckham, am a member of the American Academy of Actuaries, an Enrolled Actuary and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal & Consulting Actuary

SECTION 1 – INTRODUCTION

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. Actuarial valuations of the City of Omaha Police and Fire Retirement System (COPFRS or the System) are prepared annually to determine the actuarial contribution rate to fund the System on an actuarial reserve basis, i.e. the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the System. The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, disability, termination of employment, retirement age and salary changes to estimate the obligations of the System.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have accurately anticipated actual emerging experience. This information, along with the professional judgment of the Board, its advisors, and the actuary, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to realize that actual experience is reported short term while assumptions are intended to be long term estimates of experience. Therefore, no single experience study period should be given full credibility in setting actuarial assumptions. If significant differences exist between what is expected from our assumptions and actual experience, our strategy is usually to recommend a change in assumptions that would produce results somewhere between the actual and expected experience.

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process. From one actuary to another, there should be very little difference in numerical results. However, the setting of assumptions is a different story, as it is more art than science. In this report, we have recommended a few changes to certain assumptions. To allow a better understanding of our thought process, we offer a brief summary of our philosophy:

- **Don't Overreact**: When we see significant differences in actual versus expected experience, we generally do not adjust our rates to reflect the entire difference. If the experience is credible and we believe it reflects future expectations, we will typically recommend rates somewhere between the old rates and the new experience. If the experience during the next study period shows the same result, we will probably recognize the trend at that point in time or at least move further in the direction of the observed experience. On the other hand, if actual experience in the next study is closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.

- **Anticipate Trends**: If there is an identified trend that is expected to continue, we believe that this should be recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.

- **Simplify**: In general, we attempt to identify which factors are significant and eliminate or ignore the ones that do not materially improve the accuracy of the liability projections.

SECTION 1 – INTRODUCTION

At the request of the Board of Trustees, Cavanaugh Macdonald Consulting, LLC performed a study of the experience of the City of Omaha Police and Fire Retirement System for the period January 1, 2012 through December 31, 2015. This report presents the results and recommendations of our study which, if approved, will be implemented in the January 1, 2018 actuarial valuation of the System.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

SCOPE OF THIS REPORT

The actuarial valuation utilizes various actuarial methods and two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its impact on the System. Demographic assumptions are based on the emergence of the specific experience of the Systems' members.

All of the major actuarial assumptions that will be used in the January 1, 2018 actuarial valuation have been reviewed in this study. The remainder of this report is divided as follows:

SECTION 2   EXECUTIVE SUMMARY
SECTION 3   ACTUARIAL METHODS
SECTION 4   ECONOMIC ASSUMPTIONS
SECTION 5   DEMOGRAPHIC ASSUMPTIONS
SECTION 6   MORTALITY
SECTION 7   RETIREMENT
SECTION 8   DISABILITY
SECTION 9   TERMINATION OF EMPLOYMENT (WITHDRAWAL)
SECTION 10   SALARY INCREASES
SECTIOM 11   MISCELLANEOUS ASSUMPTIONS

2

A brief summary of the results of our findings and recommendations is shown below:

Actuarial Methods

The following table summarizes the current and proposed actuarial methods. Note that there is no recommended change to the cost method or asset valuation method. We are recommending a change to the amortization policy for the unfunded actuarial liability (UAL). We recommend that future gains/losses be amortized over a shorter timeframe to better match the demographic profile of the active membership. Therefore, our recommendation is to move to a "layered" UAL amortization methodology.

Actuarial Method	Current	Proposed
Actuarial Cost Method	Entry Age Normal	No Change
Asset Valuation Method	75% Expected + 25% Actual Market	No Change
Amortization of Unfunded Actuarial Liability		
• Number of bases	One amortization base	Layers
• Amortization period	Closed 30 Years beginning 1/1/14	Legacy at 1/1/18 remains on current schedule. New bases of gains/losses are amortized over 20 years.
• Payment methodology	Level Percent of Payroll	No Change

Economic Assumptions

The following set of economic assumptions is recommended:

	Current	Proposed
• Investment Return	8.00%	7.75%
• Inflation Assumption	3.25%	2.50%
• General Wage Increase	4.00%	3.25%
• Payroll Growth	4.00%	3.25%

Note that for the General Wage Increase, the inflation assumption was lowered from 3.25% to 2.50%, while the productivity component remained 0.75%.

Demographic Assumptions

The demographic information gathered in the last experience study had limited credibility due to a number of factors. As a result, there were no significant changes implemented at that time. During the current study period, no major benefit changes occurred that might skew the experience and while the economy has not fully recovered from the Great Recession, no other severe economic conditions existed that might limit the credibility of the data in this study period. Therefore, based on the findings in this experience study, we are recommending several changes to the current demographic assumptions:

- Despite the fact that the disability assumption was lowered in the last experience study, the number of actual disabilities in this study period was still much lower than expected. Therefore, we recommend the disability rates be reduced by 20% across the board. This reduction still provides for a reasonable margin of conservatism in the new rates.
- The retirement/DROP assumption is modified to partially reflect the observed experience while balancing reasonable expectations for the long term.
- Separate termination of employment assumptions are recommended for Police and Fire to better reflect the differences observed in termination patterns in the two groups.
- The merit scale for Police is modified to reflect the changes in the pay schedules that occurred in 2018 under the current contract.
- Due to the decrease in the general wage growth assumption, the total salary increase assumptions for both Police and Fire are lower.

Financial Impact

The estimated financial impact of the proposed changes, based on results of the January 1, 2017 actuarial valuation, is summarized on the following page. The increase in the UAL due to the proposed changes in assumptions is amortized as part of the legacy UAL. The actual impact, which will be reflected in the January 1, 2018 actuarial valuation, will vary from the numbers shown on the exhibit on the following page, but is expected to be similar when considered as a percentage change. A better evaluation of the impact of the assumption changes is the impact on the projected full funding date. The projected full funding date, based on the January 1, 2017 actuarial valuation and assuming all assumptions are met in the future (blue line), is 2043. After the proposed assumption changes are reflected (red line), this date is pushed back to 2049. If the actual return of approximately 15% for 2017 is reflected along with the expected increase in membership (green line), the system is expected to be fully funded in 2042.
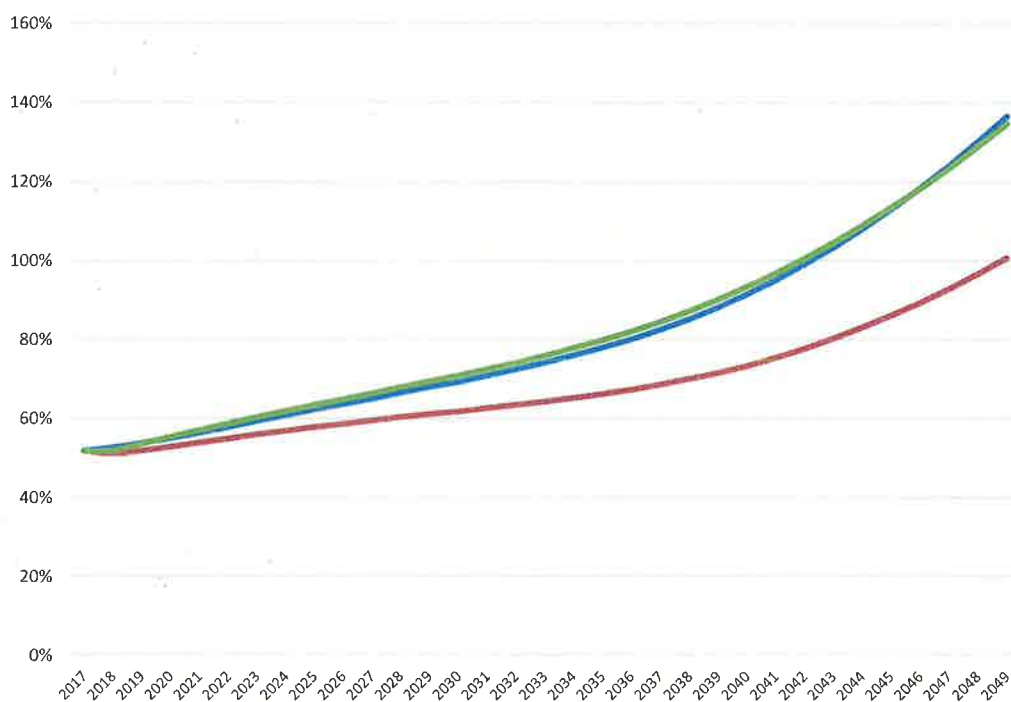
Estimate of Financial Impact of Assumption Changes
Based on January 1, 2017 Valuation

	Baseline (Current Assumptions)	Demographic Assumptions Only	All Proposed Assumptions/Methods
1. Present Value of Future Benefits	$1,553,971,022	$1,550,066,830	$1,564,017,509
2. Present Value Future Normal Costs	286,061,847	270,071,881	256,801,945
3. Actuarial Liability (1) – (2)	1,267,909,175	1,279,994,949	1,307,215,564
4. Actuarial Value of Assets	656,171,797	656,171,797	656,171,797
5. Unfunded Actuarial Liability (UAAL) (3) – (4)	611,737,378	623,823,152	651,043,767
6. Funded Ratio (4) / (3)	51.75%	51.26%	50.20%
7. Normal Cost Rate	21.991%	22.569%	22.243%
8. UAL Payment	28.221%	28.737%	31.695%
9. Actuarial Contribution Rate (7) + (8)	50.212%	51.306%	53.938%

Note: The actual impact of the assumption changes on the January 1, 2018 valuation results will vary from that shown in this table which are based on the January 1, 2017 actuarial valuation.

ACTUARIAL COST METHOD

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed; i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries **will** influence the incidence of costs by their choice of methods and assumptions.

The valuation or determination of the present value of all future benefits to be paid by the System reflects the assumptions that best seem to describe anticipated future experience. The choice of a funding method docs not impact the determination of the present value of future benefits. The funding method, determines only the incidence of cost. In other words, the purpose of the funding method is to allocate the present value of future benefits determination into annual costs. In order to perform this allocation, it is necessary for the funding method to "break down" the present value of future benefits into two components: (1) that which is attributable to the past (2) and that which is attributable to the future. The excess of that portion attributable to the past over the plan assets is then amortized over a period of years. Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial liability". The portion of the present value of future benefits allocated to the future is commonly known as "the present value of future normal costs", with the specific piece of it allocated to the current year being called "the normal cost". The difference between the plan assets and actuarial liability is called the "unfunded actuarial liability".

Two key points should be noted. First, there is no single "correct" funding method. Second, the allocation of the present value of future benefits and hence cost to the past for amortization of the UAL and to the future for annual normal cost payments is not reflective of the actual service credits earned in the past and future service credits to be earned.

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. Currently, the Entry-Age Normal method is used in the annual actuarial valuation. The rationale of the entry age normal (EAN) funding method is that the cost of each member's benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit which is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The entry age normal actuarial liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial liability, the value of plan assets is subtracted from the entry age normal actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as predicted by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

The Entry Age Normal cost method is the most commonly used cost method by public plans because it develops a normal cost rate that tends to be stable and less volatile. It also is the required cost method under calculations required by the Governmental Accounting Standards, Number 67 and 68, which are used for financial reporting. **We recommend the Entry Age Normal actuarial cost method be retained.**

ACTUARIAL VALUE OF ASSETS

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value (called the actuarial value of assets) is often used to smooth out the volatility in the market value. This is because most plan sponsors would rather have annual costs remain relatively level, as a percentage of payroll or in actual dollars, rather than a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. The American Academy of Actuaries (AAA) has basic principles regarding the calculation of a smoothed asset value, *Actuarial Standard of Practice No. 44 (ASOP 44), Selection and Use of Asset Valuation Methods for Pension Valuations.*

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to distort annual funding patterns. No matter which asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

COPFRS values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. This philosophy is consistent with the long-term nature of a retirement system. Under this method, the actuarial value of the assets is the expected value of assets plus 25% of the difference between market value and expected value, where the expected value is last year's actuarial value and subsequent cash flows into and out of the fund accumulated with interest at the valuation rate (currently 8%). This is mathematically equivalent to using a weighted average of 75% of the expected value and 25% of actual market value.

The current asset valuation method for COPFRS also includes what is known as a "corridor", which provides that once the initial determination of the actuarial value of assets is made it is compared to a corridor around market value (80% of market value to 120% of market value). If the initial actuarial value

lies outside the corridor, the final actuarial value of assets is set equal to the corresponding corridor value. For example, if the initial calculation of the actuarial value of assets is 132% of market value, the actuarial value is set equal to 120% of market value. We believe the corridor is necessary to ensure actuarial standards are met.

An asset valuation method is used to "smooth out" the volatility that occurs in the market value of assets. We believe the current method is reasonable and provides adequate smoothing while the corridor ensures the asset valuation method meets actuarial standards. **We recommend the current asset valuation method be retained.**

AMORTIZATION OF UAL

As described above, actuarial liabilities are the portion of the actuarial present value of future benefits that are not included in future normal costs. Thus it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded actuarial liabilities (UAL) exist when actuarial liabilities exceed plan assets. These deficiencies can result from (i) benefit improvements that have not been completely paid for, (ii) experience that is less favorable than expected, (iii) assumption changes that increase liabilities, or (iv) contributions that are less than the actuarial contribution rate.

There are a variety of different methods that can be used to amortize the UAL. Each method results in a different payment stream and, therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization amount increases, and
- The number of components of UAL with separate amortization bases.

Amortization Period: The amortization period can be either "closed" or "open". If it is a closed amortization period, the number of years remaining in the amortization period decreases by one each year. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but remains the same number each year. This approach essentially "refinances" the System's debt (UAL) every year, pushing off the payment of the UAL to future years. While the funded ratio may increase gradually over time under the open amortization period, the System is not expected to reach a funded ratio of 100%. The open amortization policy is especially of concern when the amortization period is very long (i.e. 25 or 30 years) due to the negative amortization that occurs with the level percent of pay financing method (UAL payment is less than the interest on the UAL so the dollar amount of the UAL continually increases). The use of an open amortization period would not be considered a "best practice" for public pension funding.

Amortization Payment Method:
Level Dollar: The level dollar amortization policy is similar to the method in which a home owner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on a predetermined number of years, until the liability is extinguished. This results in the dollar amount of the liability steadily decreasing while the payments, though remaining level in dollar terms, in all likelihood decrease as a percentage of payroll. (Even if a plan sponsor's population is not growing or even slightly diminishing, inflationary increases will usually be sufficient to increase the aggregate covered payroll).
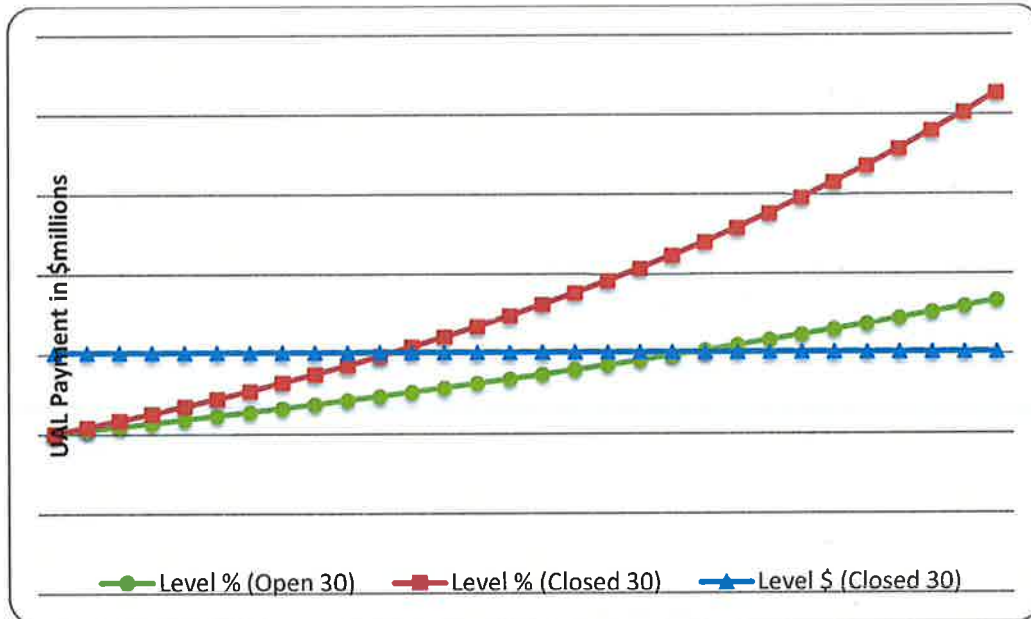
Level Percent of Payroll: The rationale behind the level percent of payroll amortization method is that since the Plan is partially funded with employee contributions that are a percentage of payroll and normal costs are calculated to remain a constant percentage of pay, unfunded actuarial liabilities should be paid off

in a similar manner. When this method of amortizing the unfunded actuarial liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method, but the dollar amount of the payments increase at a fixed rate so that ultimately the dollar amount of the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase as rapidly so that the amortization payments will remain constant, <u>as a percentage of payroll</u>. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial liability meaning that even if there are no experience losses, the dollar amount of the unfunded actuarial liability will grow (called negative amortization). This is particularly true if the plan sponsor is paying off the unfunded actuarial liability over a relatively long period, such as 25 or 30 years.

The following graph shows an example of the dollar amount of amortization payment under the different amortization methods, discussed earlier:

Use of the level percentage of payroll amortization has its advantages and disadvantages. From a budgetary standpoint, it makes sense to develop UAL contribution rates that are level as a percentage of payroll since contributions to fund the Plan are made as a percent of payroll and normal cost is developed as a level percent of payroll. However, if payroll doesn't grow as expected, the UAL payment will increase as a percent of payroll rather than remain level or in the case of a fixed contribution rate, actual UAL contributions will be lower than expected and the UAL will be higher than expected. In addition, this approach clearly results in slower funding of the UAL, as illustrated in the following graph:
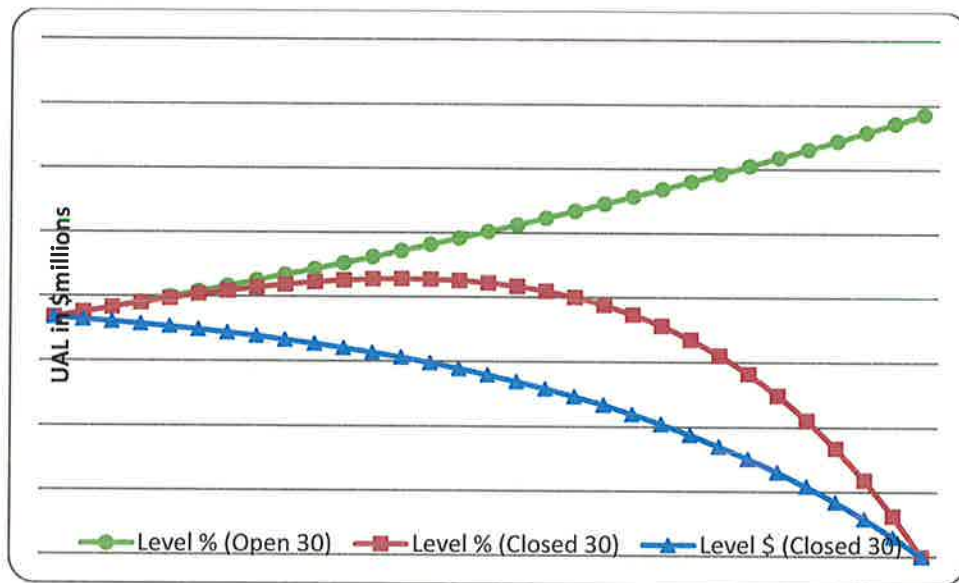
Amortization bases: The UAL can be amortized as one base with one payment amount, or in component parts or layers. As a result of the last experience study, the amortization period was reset to 30 years beginning on January 1, 2014. The changes made to both the benefit structure and the contributions to address the System's long term funding in 2010 and 2013 will require many years before the changes have a material impact on the valuation results. This supports the use of a longer amortization period for the "old" UAL, referred to as the "legacy UAL". However, we recommend that actuarial gains/losses, due to actual experience that is different than assumed, be amortized over a shorter period, such as 20 years, that better matches the demographics of the membership. **In summary, we recommend the current amortization policy be changed to a "layered" amortization with the January 1, 2018 valuation. The legacy UAL will continue to be amortized over the current closed period (26 years in the 2018 valuation) and each new piece of UAL from future actuarial experience (actual vs expected) will be amortized over a closed amortization period of 20 years from the valuation date in which the experience is measured.**

ECONOMIC ASSUMPTIONS

The economic assumptions used in the COPFRS valuation include price inflation, long-term investment return, wage growth (the across-the-board portion of individual salary increases) and the increase in the covered payroll assumption. Unlike demographic assumptions, economic assumptions do not lend themselves to analysis merely on the basis of internal historical patterns because economic assumptions are influenced more by external forces in the economy which are difficult to accurately predict over the long term. The investment return and general wage increase assumptions are selected on the basis of expectations in an inflation-free environment and then increased by the long-term expectation for inflation, called the "building block" approach.

Sources of data considered in the analysis and selection of the economic assumptions included:
- 2017 Social Security Trustees Report
- Future expectations of COPFRS' investment consultant, DeMarche Associates
- Future expectations of other investment consultants (2017 Horizon Survey)
- U.S. Department of the Treasury bond rates
- Assumptions used by other large public retirement systems, based on the Public Fund Survey, published by the National Association of State Retirement Administrators (NASRA)
- Historical observations of price and wage inflation statistics and investment returns.

Actuarial Standard of Practice Number 27

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment.

With respect to relevant data, the standard recommends the actuary review appropriate recent and long-term historical economic data, but advises the actuary not to give undue weight to recent experience. Furthermore, it advises the actuary to consider that some historical economic data may not be appropriate for use in developing assumptions for future periods due to changes in the underlying environment. In addition, with respect to any particular valuation, the standard requires that each economic assumption be consistent with all other economic assumptions over the measurement period.

ASOP 27 recognizes that economic data and analyses are available from a variety of sources, including representatives of the plan sponsor, investment advisors, economists, and other professionals. The actuary is permitted to incorporate the views of experts, but the selection or advice must reflect the actuary's professional judgment. ASOP 27 requires the actuary to select a "reasonable" assumption. For this purpose, an assumption is reasonable if it has the following characteristics:

    a.   it is appropriate for the purpose of the measurement;

    b.   it reflects the actuary's professional judgment;

    c.   it takes into account historical and current economic data that is relevant as of the measurement date;

    d.   it reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and

e. it has no significant bias (i.e., it is neither significantly optimistic nor pessimistic) except when provisions for adverse deviation or plan provisions that are difficult to measure are included.

The standard also discusses a "range of reasonable assumptions" which in part states "the actuary should also recognize that different actuaries will apply professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice."

The remaining section of this report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of the COPFRS. In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table summarizes the recommendations for economic assumptions:

	Current Assumptions	Recommended Assumptions
A. Consumer Price Inflation	3.25%	2.50%
B. Investment Return	8.00%	7.75%
C. General Wage Growth	4.00%	3.25%
D. Covered Payroll Increase	4.00%	3.25%

Price Inflation

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage growth (which then impacts individual salary increases), and payroll growth.

The long-term relationship between price inflation and investment return, recognized by economists, is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while lower inflation rates are expected to result in lower expected investment returns, at least in the long run.

The current assumption for price inflation is 3.25% per year which was recommended and adopted in the last experience study.
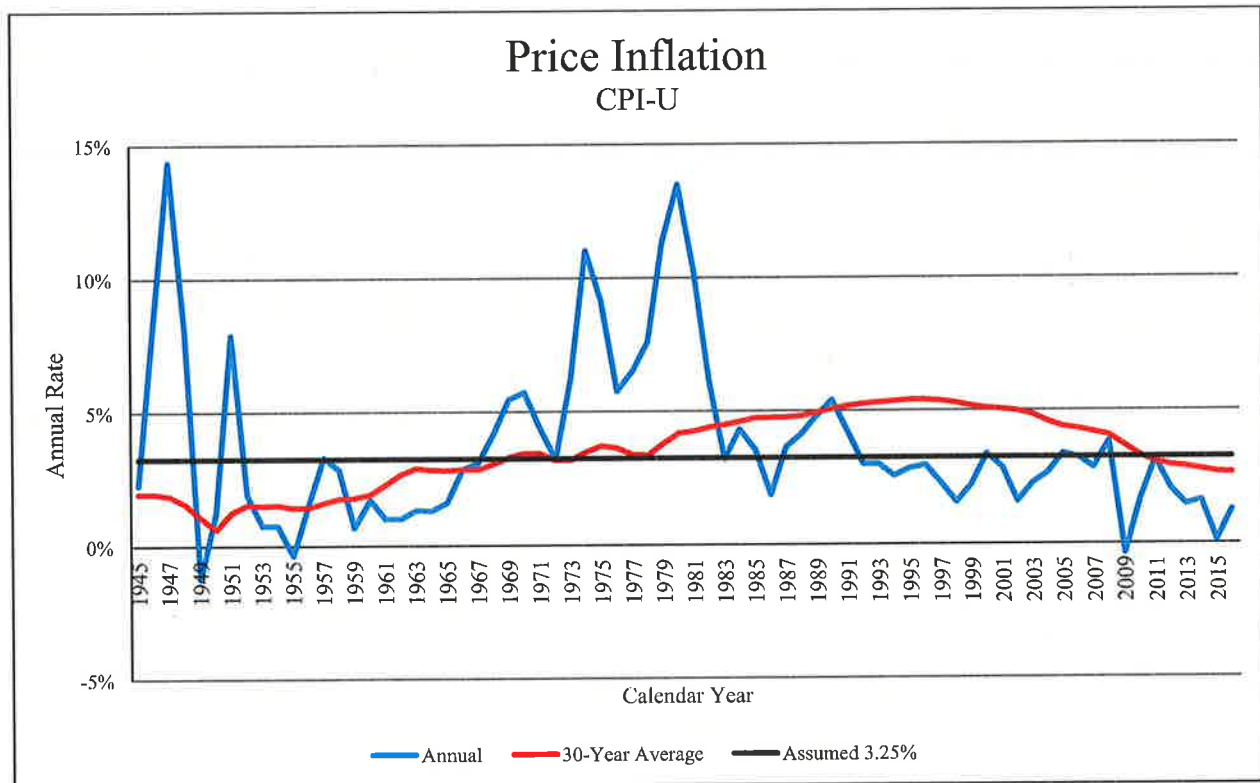
Past Experience: Although economic activities, in general, and inflation in particular, do not lend themselves to prediction solely on the basis of historical analysis, historical patterns and long-term trends are factors to be considered in developing the inflation assumption. The Consumer Price Index, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The following table provides historical annualized rates and annual standard deviations of the CPI-U over periods ending December 31st.

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2016	90	2.94%	3.83%
1956 – 2016	60	3.70	2.75
1966 – 2016	50	4.09	2.82
1976 – 2016	40	3.66	2.77
1986 – 2016	30	2.65	1.22
1996 – 2016	20	2.15	1.04
2006 - 2016	10	1.76	1.29

The following graph illustrates the historical annual change in price inflation, measured as of December 31 for each of the last 70 years, as well as the thirty year rolling average.

Over more recent periods, measured from December 31, 2016, the average annual rate of increase in the CPI-U has been well below the current assumption of 3.25%. While it is true that the period of high inflation from 1973 to 1982 has a significant impact on the averages over periods which include these rates, the decline in inflation shown in the data above is clear.

Implied Forecasts of Inflation

Bond Market

Additional information to consider in formulating this assumption is obtained from measuring the spread on Treasury Inflation Protected Securities (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities (bonds) and the inflation indexed yield on TIPS of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. At December 2016, the bond market expected inflation to be around 2.1% over the next 30 years. The bond market expectations may be heavily influenced by the low interest rate environment created by the Federal Reserve Bank's manipulation of the bond market. Whether inflation returns to the higher rates observed historically remains to be seen.

Investment Consultants

COPFRS' investment consultant, DeMarche Associates, also has an inflation forecast in their capital market assumptions. Their short-term assumption is 2.0% and their longer-term assumption is 2.7%. It can also be insightful to compare the inflation assumptions of other investment consultants. Horizon Actuarial Services prepares an annual study in which they survey various investment advisors and provide ranges of results as well as medians. The 2017 Horizon Survey included a total of 35 investment advisors who provided their capital market assumptions of which 12 provided both short-term and long-term assumptions. The range of inflation assumptions for all of the participating firms (short term outlook) was 1.6% to 2.8% with a median of 2.2%. For the firms providing long-term assumptions, the range was 2.2% to 2.8% with a median inflation assumption of 2.5%.

Social Security Administration

Although many economists forecast lower inflation than the assumptions used by retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the most recent report (July 2017), the projected average annual increase in the CPI over the next 75 years was estimated to be 2.6%, under the intermediate cost assumption. The range of inflation assumptions used in the Social Security 75-year modeling, which includes a low and high cost scenario, in addition to the intermediate cost projection, was 2.00% to 3.20%.

Other Forecasts

Another source to consider in setting this assumption is a quarterly survey of the Society of Professional Forecasters (economists) that is conducted by the Philadelphia Federal Reserve. Their most recent forecast (third quarter of 2017) was for inflation over the next ten years (2017 to 2026) to average 2.25%.

Peer System Comparison

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. Based on the Public Plan Database (a survey of over 125+ state and local retirement systems maintained by a collaboration between the Center for Retirement Research at Boston College, the Center for State and Local Government Excellence, and the National Association of State Retirement Administrators), the average inflation assumption for governmental plans has been steadily declining. Based on the current data, both the average and median inflation assumption is 3.00%. However, the survey is based on valuations that are from 2014 or 2015.

Based on our experience, we believe that further declines in the inflation assumption have occurred for many systems over the last few years.

Comparison of Inflation Expectations

The following table provides a comparison of the current levels of expected inflation.

Source	Expected Inflation
COPFRS Consultant (DeMarche)	2.50%*
Horizon Survey	2.50%
Bond Market	2.10%
2017 Social Security Report	2.60%
Survey of Professional Forecasters	2.25%

*Blended rate of 2.00% for ten years and 2.70% for twenty years.

Conclusion: While actuarial standards caution against too much consideration of recent events, the lower inflation over the last 10, 20 and even 30 years, coupled with the low future inflation anticipated by the bond markets, investment consultants, and professional economic forecasters suggests that there may have been a fundamental change away from the longer term historical norms. Based on the information presented above, **we recommend a reduction in the inflation assumption from 3.25% to 2.50%.**

Consumer Price Inflation	
Current Assumption	3.25%
Recommended Assumption	2.50%

INVESTMENT RETURN

Use In The Valuation: The investment return assumption reflects the anticipated returns on the current and future assets. It is one of the primary determinants in the allocation of the expected cost of the System's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. It is also the most powerful assumption used in the valuation process with small changes producing significant changes to the liabilities and contribution rates. Generally, the investment return assumption is set with consideration of the asset allocation policy, expected long-term real rates of return on the specific asset classes, the underlying inflation assumption, and investment expenses.

The current investment return assumption is 8.00% per year, net of all investment-related expenses (administrative expenses are paid directly by the City). The 8.00% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is price inflation (previously discussed). Any additional return over price inflation is referred to as the real rate of return. The real rate of return, based on the current set of assumptions, is 4.75% (8.00% nominal return less 3.25% inflation). In the last experience study, the 8.00% nominal rate of return represented the 40th percentile results indicating there was about a 60% probability that the long-term average rate of return would be at least 8.00%, based on the investment consultant's assumptions.

Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon so as to make prudent choices regarding how to invest the trust funds, i.e., asset allocation. For actuarial calculations, we typically consider very long periods of time as some current employees will be receiving benefit payments more than 65 years from now. For example, a newly-hired employee who is 25 years old may work for 30 years, to age 55, retire and live another 35 years, to age 90. The retirement system would receive contributions for the first 30 years and then pay out benefits for the next 35 years. During the entire 65-year period, the system is investing assets on behalf of the member's liability. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received _after_ the employee retires. In addition, in an open plan like COPFRS, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in time horizon between investment consultants and actuaries is frequently a source of debate and confusion when setting economic assumptions.

Actuarial Standards of Practice Number 27 (ASOP 27) provides guidance to actuaries on the selection of economic assumptions used for measuring pension obligations. The current version of ASOP 27 calls for the actuary to select a "reasonable" assumption. It goes on to say an assumption is "reasonable" if it has no significant bias (i.e. it is neither significantly optimistic nor pessimistic). The standard also describes a "range of reasonable assumptions". In part, this definition states, "the actuary should also recognize that different actuaries will apply different professional judgment and may choose different, reasonable assumptions". As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used if the year-to-year results vary widely, as they do. Even though history provides a valuable perspective, the economy of the past is not necessarily the economy of the future. In addition, asset allocations may have changed over the period so returns may not be directly comparable.

The System's actual investment return on the market value of assets is shown in the graph below:

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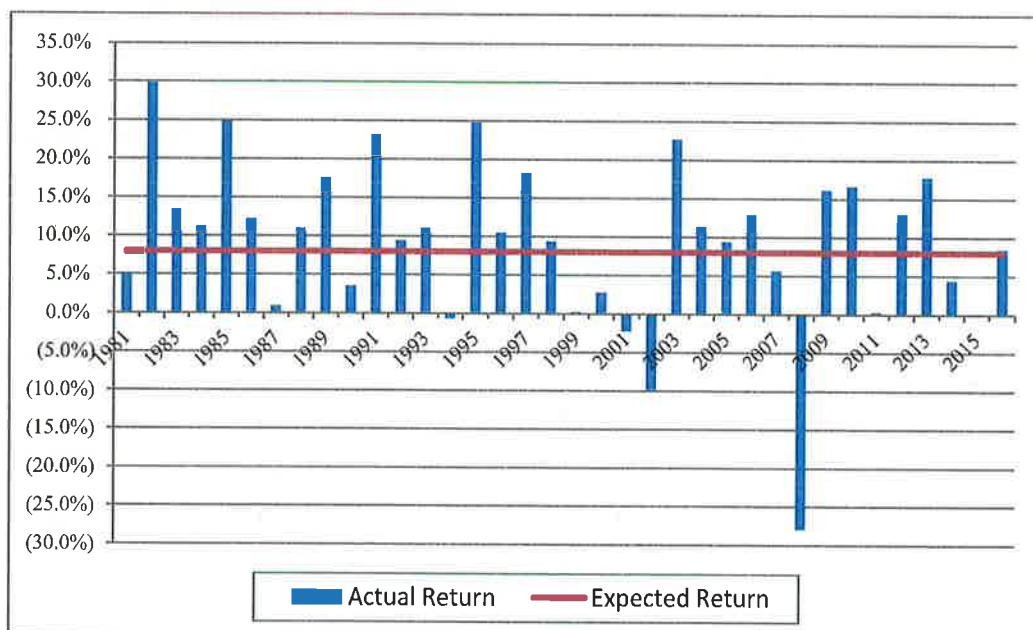
The compound return has varied significantly when viewed over different time periods. For example, the rate of return over the ten-year period ending December 31, 2016 was 4.8%, over the twenty-year period ending December 31, 2016 was 6.0% and over the thirty-year period ending December 31, 2016 was 7.6%.

Forward Looking Analysis

We believe the most appropriate analysis to consider in setting the investment return assumption is to model the expected returns, given the system's target asset allocation and forward-looking capital market assumptions. However, we are trained as actuaries and not as investment professionals. Since ASOP 27 provides that the actuary may rely on outside experts, we believe it is appropriate to heavily weigh the market outlook and expectations provided by the COPFRS' investment consultant, DeMarche Associates.

COPFRS' current target asset allocation, along with their investment consultant's (DeMarche Associates) secular (long-term) capital market assumptions, are shown in the following table:

Asset Category	Asset Allocation	Expected Rate of Return (Arithmetic)	Standard Deviation
Large Cap Equity	11.0%	9.3%	17.0
Small Cap Equity	12.0%	10.7	23.0
International Equity	12.0%	9.8	20.0
Emerging Markets	10.0%	11.8	27.0
Fixed Income - Intermediate	5.0%	5.2	6.1
Fixed Income – High Yield	5.0%	7.7	10.0
Real Estate	20.0%	7.9	7.0
Timber	5.0%	7.0	8.5
Private Equity	13.5%	11.8	13.6
Commodities	3.0%	8.5	20.0
Global Hedge Funds	3.5%	6.7	8.0
Total	100%		

Using the target asset allocation shown in the prior table, we applied a standard mean/variance model to calculate percentile return estimates based on these capital market assumptions. The results in the following table provide an expected range of returns, using DeMarche's long-term (secular) capital market assumptions.

Time Span In Years	Mean Return	Standard Deviation	Returns by Percentile				
			5th	25th	50th	75th	95th
1	9.32%	10.84%	-7.55%	1.76%	8.79%	16.30%	28.02%
5	8.89	4.82	1.15	5.59	8.79	12.08	17.00
10	8.84	3.41	3.33	6.51	8.79	11.11	14.53
20	8.81	2.41	4.90	7.18	8.79	10.42	12.82
30	8.80	1.97	5.60	7.47	8.79	10.12	12.07

Looking at one year's results produces a median return of 8.79% but also has a high standard deviation or measurement of volatility illustrated by the range of results, i.e. 5% of the results will be below -7.55% and 5% will be above 28.02%. By expanding the time horizon, the average (mean) return does not change much, but the volatility declines significantly (range for 30 year time span is 5.60% to 12.07%). Based on these assumptions, there is 50% likelihood that the compound average rate of return over a 30-year period will be 8.79% or higher. As the time span increases, the range of expected results narrows. Over a 30-year time span, the results indicate there is a 25% chance that returns will be below 7.47% and a 25% chance they will be above 10.12%. In other words, there is a 50% chance the compound return will be between 7.47% and 910.12%.

However, the outlook for returns in the short term is much lower as shown in the results below using both DeMarche's short-term (Moderate) and long-term (Secular) capital market assumptions:

Time Span In Years	Mean Real Return	Standard Deviation	Returns by Percentile				
			25th	40th	50th	60th	75th
DeMarche Moderate (Short Term) Assumptions							
30	7.40%	2.23	5.88%	6.81%	7.37%	7.94%	8.89%
DeMarche Secular (Long Term) Assumptions							
30	8.80%	1.97	7.47%	8.29%	8.79%	9.29%	10.12%

Given the DeMarche inflation assumptions for both sets of assumptions, these results indicate a real rate of return of 5.37% in the short term and 6.09% in the long term.

Using Other Consultants' Assumptions (Horizon Survey)

Many investment firms or investment consulting firms produce estimates of future asset returns, similar to the expected return analysis developed by DeMarche. While it might seem desirable to compare these estimates, there is a challenge to such effort. There are comparison challenges in certain asset classes such as international stock (emerging or developed markets), bonds (duration and credit quality), and alternatives (a very broadly interpreted category). For this reason, we believe there is limited value in trying to compare the expected return developed by DeMarche with the assumptions of another group of investment professionals. Nonetheless, the alternative analysis using other consultants' assumptions can still provide value as a general confirmation of the analysis using DeMarche's capital market assumptions.

Because the goal of this analysis is to corroborate the overall reasonableness and trends of the DeMarche results, we consider sets of capital market assumptions resulting from a survey of investment advisors conducted by Horizon Actuarial Services in 2017. The survey looks at the 10-year horizon capital market assumptions for 35 investment advisors. In addition, the survey also includes the results of the 12 advisors who provide assumptions for a twenty-year (or longer) time frame. A summary of these distribution of expected real returns, under both sets of assumptions, are displayed in the following tables:

Time Span In Years	Mean Return	Standard Deviation	Returns by Percentile				
			25th	40th	50th	60th	75th
Short Term Horizon Assumptions							
30	7.31%	2.44	5.65%	6.67%	**7.28%**	7.90%	8.94%
Long Term Horizon Assumptions							
30	8.34%	2.44	6.68%	7.69%	**8.31%**	8.93%	9.96%

One item to note is that the expected return, using the 20-year assumptions, is about 1% higher than the expected return using the short-term assumption (the next 10 years). The difference under the DeMarche assumptions was 1.42%. While actuarial assumptions are set with the long term in mind, the difference in short term and long term expectations is large enough that it cannot be ignored, particularly given the funding and liability demographics of the System.
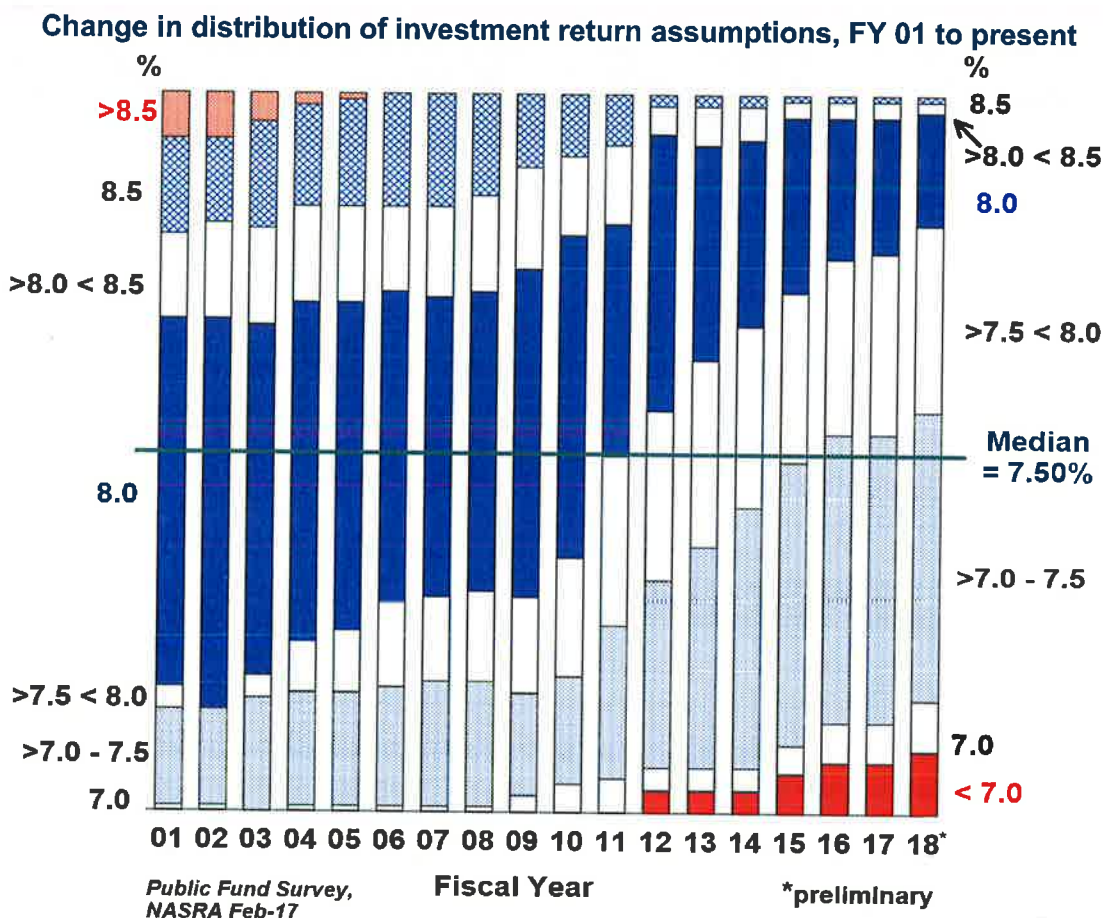
Peer System Comparison

Public retirement systems have historically compared their investment performance to their peer group. While we believe there is some merit in assessing the general movement in the assumed rate of return for other systems, in our opinion this is not an appropriate basis for setting this assumption on its own. For example, different plans have different asset allocations which impact the assumed rate of return. In addition, the plan dynamics of each system may also impact the Board's choice of the assumed investment return. This peer group information merely provides another set of relevant data to consider, as long as we recognize that asset allocation and Board risk tolerance varies from system to system.

The graph below shows the change in the distribution of the investment return assumption from fiscal year 2001 through February, 2017 for the 120+ large public retirement systems included in the NASRA Public Fund Survey. As it indicates, the investment return assumptions used by public plans have decreased over the last fifteen years, likely heavily impacted by a corresponding decrease in the underlying inflation assumption over the same period. It is worth noting that the median investment return assumption in fiscal year 2012 dropped from 8.00% to 7.75% and has declined further to 7.50% in 2016 and 2017. We believe we will continue to see more systems moving to a lower assumption as future experience studies are completed in the next few years.

Change in distribution of investment return assumptions, FY 01 to present

Public Fund Survey, NASRA Feb-17

Fiscal Year

*preliminary

Administrative Expense Assumption

All investment-related expenses are paid from returns on the plan assets and administrative expenses are paid directly by the City. Therefore, no assumption for administrative expenses is necessary in the calculation of the actuarial required contribution.

Considerations

While the System is expected to have an indefinite life span, it is a very mature retirement system with a significant portion of its total liability attributable to current retirees and beneficiaries. The January 1, 2017 valuation indicates that 66% of the $1.3 billion actuarial accrued liability was attributable to members who are currently receiving a benefit from the system. Due to the Plan's maturity, we believe the investment return assumption should not ignore the short-term forecast for investment returns.

In addition, due to its maturity COPFRS currently has negative cash flow, i.e., benefit payments exceed the amount of contributions each year. This is to be expected in a mature plan since the whole reason assets were accumulated in prior years was to pay out benefits to retirees. For the year ended December 31, 2016, the negative cash flow was $8 million, about 1.3% of assets, and the gap between contributions (inflows) and benefit payments (outflows) over the next twenty years is expected to grow. This situation is a concern when the return expectations are considerably lower in the short term than the longer term, as is currently the case. Essentially, there are fewer assets to be reinvested to earn the higher returns that occur in later

20

years. Thus, the impact on the accumulation of the trust fund assets can be significant, and the short-term assumptions need to be given more weight because of the plan demographics and funding dynamics.

The System's funded ratio in the last actuarial valuation, prepared as of January 1, 2017, was 52%. Given the low funded level, the System has considerable risk in the short term. Coupled with the portion of the liability attributable to current retirees and the outlook for lower returns in the short term, we believe some conservatism in the investment return is warranted.

Finally, the System is funded with fixed contribution rates that are negotiated in the labor contracts. With the inability for contribution rates to automatically increase in future years to compensate for actual investment experience that is lower than expected by the assumption, we believe that it is prudent to include some conservatism in setting the investment return assumption. In the last experience study, the 8.00% return represented the expected return at the 40th percentile (indicating a 60% chance that the expected returns would be equal to or greater than the assumption). The comparable number in this study, blending returns on both the short-term and long-term assumptions, is 7.79%.

Recommendation:

Because investment earnings account for the majority of revenue for most public plans, the choice of an investment return assumption has a major impact on a system's financing and actuarial funded status. An investment return assumption that is too low will overstate liabilities and costs, causing current members/ taxpayers to be overcharged and future members/taxpayers to be undercharged. An investment return assumption that is too high will understate liabilities and undercharge current members/taxpayers at the expense of future members/taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and inequitable distribution of costs among generations of members/ratepayers. Because of this, setting the investment return assumption requires a balancing act with an attempt to not be overly conservative nor aggressive, although some margin for adverse deviation is probably prudent.

After reviewing all of the available information and taking the factors discussed above into consideration, **we recommend the 8.00% investment return assumption be lowered to 7.75%**, composed of an inflation assumption of 2.50% and a real rate of return of 5.25%. Note that this represents an increase in the real rate of return from the current assumption.

The components of the nominal return are shown in the following table:

	Current Assumption	Proposed Assumption
Real return	4.75%	5.25%
Price inflation	3.25%	2.50%
Nominal return	8.00%	7.75%

GENERAL WAGE GROWTH

Background: General wage growth, thought of as the "across the board" rate of salary increases, is composed of the price inflation assumption and an assumption for the real rate of wage increases/real wage growth. The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity growth.

In constructing the salary increase assumption used to project future salary increases for individual members, the wage growth assumption is combined with an assumption for service-based salary increases (called a merit scale). The service-based salary increase assumption will be addressed when the demographic assumptions are studied. Given the current price inflation assumption of 3.25%, the current wage growth assumption of 4.00% implies an assumed real rate of wage increase or real wage growth assumption of 0.75%.

Historical Perspective: Wage statistics are found in the Social Security System database on the National Average Wage data. This information goes back to 1955 and is the most comprehensive database available. Because the National Average Wage is based on all wage earners in the country who are covered by Social Security, it can be influenced by the mix of jobs (full-time vs. part-time, manufacturing vs. service, etc.) as well as by changes in some segments of the workforce that are not seen in all segments (e.g. regional changes or growth in computer technology). Furthermore, if compensation is shifted between wages and benefits, the wage index would not accurately reflect increases in total compensation.

COPFRS' membership is composed exclusively of public safety employees working in Omaha, Nebraska, whose wages and benefits are linked as a result of the state and local economy, funding allocations, and governing policies. Because the competition for workers can, in the long term, extend across industries and geography, the broad national earnings growth will have some impact on COPFRS members, however, less so than for general civilian employee jobs.
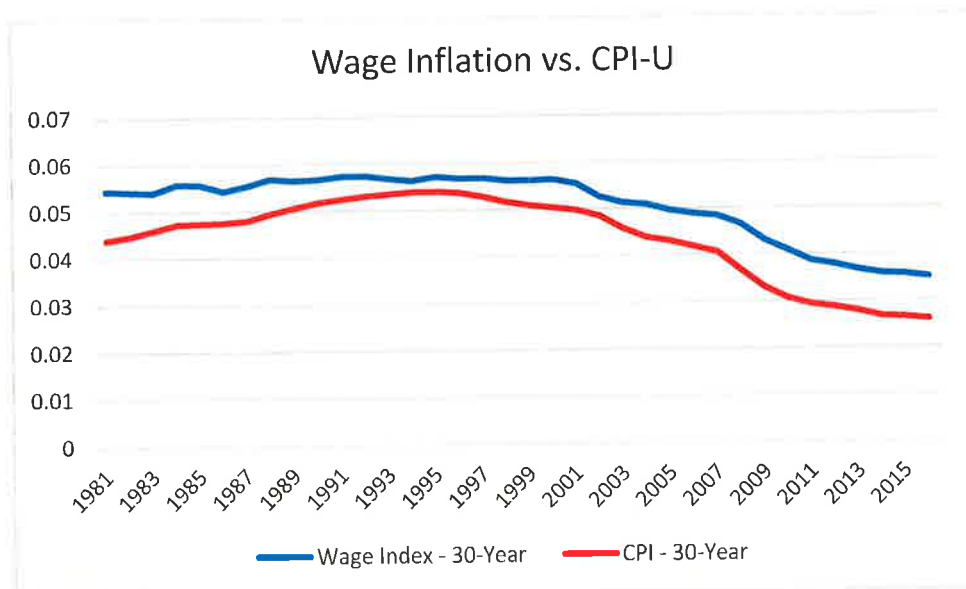
The excess of wage growth over price inflation represents the real wage growth rate. The following table shows the compounded wage growth in the United States over various periods, along with the comparable price inflation for the same period. The differences represent the real wage growth rate.

Years	Period	General Wage Inflation	CPI Increase	Real Wage Inflation
2006-2016	10	2.3%	1.8%	0.5%
1996-2016	20	3.2%	2.2%	1.0%
1986-2016	30	3.5%	2.7%	0.8%
1976-2016	40	4.2%	3.7%	0.5%
1966-2016	50	4.7%	4.1%	0.6%
1956-2016	60	4.5%	3.7%	0.8%

Similar information over rolling thirty year periods is shown in the following graph:

Wage Inflation vs. CPI-U

Over the last 30 years, the real wage increase, as measured by the increase in the National Average Wage Index, has been 0.8% per year on average. A somewhat similar, but slight different set of data is available from the Bureau of Labor Statistics, which reports the median weekly wage for full-time employees. Over the last 30 years, this amount (adjusted for inflation) has had an average increase of 0.2% per year. Part of the difference in these results arises from the difference between using an average and a median. There are also technical differences arising from which workers are included in each measure. The applicability of this general wage data to public safety employees is uncertain. However, wages for public safety employees will generally have to increase at least as rapidly as the general economy if the City wishes to remain competitive in attracting new employees in the Omaha job market.

Forecasts of Future Wages: The wage index used for the historical analysis is projected forward by the Office of the Chief Actuary of the Social Security Administration in their 75-year projections. In the July, 2017 Trustees Report, the annual increase in the National Average Wage Index under the intermediate cost assumption (best estimate) was 3.8%, 1.2% higher than the Social Security Administration's intermediate inflation assumption of 2.6% per year. The range of the assumed real wage growth in the 2017 Trustees report was 0.5% to 1.8% per year. In our opinion, the Social Security assumptions are less applicable to the specific increases in the wages of public safety members.

Analysis and Conclusion: Over the last 30 years, the actual experience on a national basis has been slightly higher than the current assumption. However, this is based on Social Security data which uses the average wages of all U.S. workers. As mentioned earlier, the median real wage increase has been significantly lower. We believe that wages will continue to grow at a greater rate than prices over the long term, although not necessarily at the level projected by Social Security.

Based on the available data and our professional judgment, **we recommend that the long-term assumed real wage growth remain 0.75% per year. When coupled with the reduction in the price inflation assumption to 2.50%, the resulting general wage growth assumption decreases from 4.00% to 3.25%.**

PAYROLL GROWTH ASSUMPTION

Amortization payments on the unfunded actuarial liability are currently determined as a level percent of payroll. Therefore, the valuation requires an assumption regarding future annual increases in covered payroll. The wage growth assumption is typically used for this purpose. The current payroll growth assumption is 4.00%, the same as the current wage growth assumption.

We propose continuing the current assumption that no future increase or decrease in the number of active members will occur. If increases should occur not only because of wage increases, but also because of additional active members, there will be a larger pool of salaries over which to spread the payment on the unfunded actuarial liability, which would result in lower UAL payments, as a percent of payroll. **We recommend the payroll growth assumption be set at 3.25%.**

DEMOGRAPHIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 35 provides guidance to actuaries regarding the selection of demographic and other non-economic assumptions for measuring pension obligations.

ASOP 35 General Considerations and Application

Each individual demographic assumption should satisfy the criteria of ASOP 35. In selecting demographic assumptions the actuary should also consider: the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 35.

Overview of Analysis

The purpose of a study of demographic experience is to compare what actually happened to the individual members of the System during the study period (calendar years 2012 through 2015) with what was expected to happen based on the actuarial assumptions. A single four-year period is a relatively short observation period, particularly given the size of the group. Therefore, some of the experience observed in the study may not be representative of long term trends. In addition, the System's size limits the credibility of the findings. Our recommendations were made after taking these factors into account.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the study is tabulated by age, duration, gender, group, and membership class (active, retired, etc.).

- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.

- Finally, the number of actual decrements is compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio), and is expressed as a percentage.

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Judgment is required to anticipate future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

It takes a fair amount of data to provide experience study results that are fully credible for demographic assumptions. Because the membership or certain subsets of the membership are relatively small, some assumptions have been selected based more on our professional judgment of reasonable future outcomes than actual experience.

ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Pursuant to ASOP 35 the actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include, but are not limited to, retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.

2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.

3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age or service. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.

4. Select the specific assumptions. In selecting an assumption the actuary should consider the potential impact of future plan design as well as the factors listed above.

5. Evaluate the reasonableness of the selected assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

MORTALITY

One of the most important demographic assumptions in the valuation is mortality because it projects the duration of retirement benefit payments. If members live longer than expected, the true cost of future benefit obligations will be understated.

Rates of mortality declined throughout the 20th century and have continued to decline, which means that, in general, people are living longer. Consequently, we anticipate that mortality tables will need to be updated periodically to reflect actual mortality trends, even if we are anticipating some increase in longevity. Because of potential differences in mortality, we break down our study by gender (males and females) and by status (healthy retirees, disabled retirees, and active members).

Because of the substantial amount of data required to construct a mortality table, actuaries usually rely on standard tables published by the Society of Actuaries. Actuaries then use various adjustments to these standard, published mortality tables in order to better match the observed mortality rates of a specific group, including:

(1) Age adjustments
(2) Collar adjustment (White Collar and Blue Collar)
(3) Scaling of rates

The first of these adjustments is an age adjustment that can be either a "set back" or a "set forward". A one-year age set forward treats members as if they were one year older than they truly are when applying the rates in the mortality table. So, a one year set forward would treat a 61 year old retiree as if he will exhibit the mortality of a 62 year old in the standard mortality table.

The second adjustment is called a collar adjustment. There are both "white collar" and "blue collar" variants of some of the newer mortality tables that reflect different mortality patterns. These variants, whose use is not necessarily limited to populations that have only white or blue collar employees, provide options which may result in a better fit of the assumed mortality table to the actual experience.

A third adjustment, which requires a significant amount of data, that can be used to adjust the mortality rates in a standard table to better fit actual experience is to "scale" a mortality table by multiplying the probabilities of death by factors less than one (to reflect better mortality) or factors greater than one (to reflect poorer mortality). Scaling factors can be applied to an entire table or a portion of the table. Of course, if needed, actuaries may use two or even all three of these methods to develop an appropriate table to model the mortality of the specific plan population.

The issue of future mortality improvement is one that the actuarial profession is very focused on and continues to study and monitor trends. This has resulted in changes to the relevant Actuarial Standard of Practice, ASOP 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. This ASOP requires the pension actuary to make and disclose a specific recommendation with respect to future improvements in mortality after the valuation date, although it does not require that an actuary assume there will be future improvements. There have been significant improvements in longevity in the past, although there are different opinions about future expectations, and thus there is a subjective component in the estimation of future mortality improvements.

There are two widely-used ways to reflect future improvements in mortality:
  (1) Static table with "margin"
  (2) Generational mortality

Static Tables with Margin

The first approach to reflect mortality improvements is through the use of a static mortality table with "margin." Under this approach, the Actual to Expected Ratio is intentionally targeted to be over 100% so that mortality can improve without creating actuarial losses. This approach is mandated by the Internal Revenue Service for determining minimum funding amounts for corporate pension plans as mortality improvements are projected seven years for retirees and 15 years for actives. While there is no formal guideline for the amount of margin required (how far above 100% is appropriate for the Actual to Expected Ratio), typically actuaries prefer to have a margin of around 10% at the core retirement ages. The goal is still for the general shape of the curve to be a reasonable fit to the observed experience. Depending on the magnitude and duration of mortality improvement, the margin would decrease and eventually may become insufficient. When that occurs, the assumption would need to be updated.

Generational Mortality

Another approach, referred to as generational mortality (currently used in the COPFRS valuation), directly anticipates future improvements in mortality by using a different set of mortality rates based on each year of birth, with the rates for later years of birth generally assuming lower mortality than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of mortality tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2050 has a longer life expectancy than a member who turns age 65 in 2020. When using generational mortality, the Actual to Expected Ratios for the observed experience are set near 100% as future mortality improvements will be taken into account directly in the actuarial valuation process by applying lower probabilities of death in future years. The generational approach is our preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with what we believe is more likely to occur. This is the method currently used in the COPFRS valuation and we recommend it continue to be used.

Healthy Retirees: The valuation currently uses separate mortality assumptions for male and female members. The RP-2000 Healthy Annuitant Mortality Table for Males and Females, with generational mortality using Projection Scale AA to anticipate mortality improvements in future years, with ages set forward one year (e.g. an individual who is age 65 is assumed to exhibit the mortality of a 66-year old) is used to predict the probability of death for members receiving benefits.

In examining the results of the Experience Study, if the A/E Ratio is greater than 100%, the assumptions have predicted fewer deaths than actually occurred and with an A/E Ratio less than 100%, the assumptions have predicted more deaths than have actually occurred.

In recent experience studies, we have started to also analyze mortality experience on a benefit-weighted basis where the exposures and deaths are multiplied by the monthly retirement benefit amount. This helps to reflect any differences that arise from better mortality experience among those with larger benefits. Because a valuation is designed to measure the amount and timing of future benefit payments (liability) rather than simply the number of retirees leaving pay status, this benefit-weighted approach can be an important factor in developing a mortality assumption to value system obligations. This methodology is particularly useful when there is significant variation in the amount of benefits for members of any given age in the group. For a public safety group, there is much less variation in the amount of benefits for

members of a given age. Most of the variation in benefit amount for this group is due to retirement at different points in time. Given this fact, analysis on a benefit-weighted basis would more heavily weight the experience of more recent retirees.

In addition, in reviewing the retiree data there were very few deaths below age 65 (3 deaths in 4 years) and only 3 more deaths between ages 65 and 70. Including this data in any analysis of retiree mortality will distort the results (A/E ratio was 81% for ages 55 to 90) and potentially lead to a recommended mortality assumption that is overly conservative. In order to better evaluate the current mortality assumption, we considered only the actual and expected deaths from ages 70 to 90 where the data was sufficient to create more credible analysis. The aggregate observed experience for healthy (not disabled) male retirees, ages 70 to 90, during the study period is shown in the following table. There is an insufficient number of female retirees to provide any reasonable analysis for that group so the information is not shown.

Healthy Male Retirees		
		A/E Ratio
Observations		
	Actual	Expected	Current
Police	21	23	91%
Fire	28	25	112%
Total	49	48	102%

Based on the current assumption, actual deaths for healthy males, ages 70 to 90, were very close to the number expected (49 compared to 48 over a four-year study period) with an A/E ratio of 102%. Given the size of the group, some volatility in the A/E ratio is to be expected from period to period. However, as discussed earlier, the small number of deaths below age 70 skews the results for the entire group regardless of which mortality table is used to develop expected deaths. Therefore, in order to better analyze the actual mortality experience, we focused our analysis on the key ages of 70 to 90 where there were a sufficient number of deaths to provide credible experience. As noted earlier, the A/E ratio using the current mortality assumption was 102%. This indicates that the current mortality table, along with the current projection scale, is a reasonable fit to the actual experience. **Therefore, we recommend the current mortality assumption, RP-2000 Healthy Annuitant Mortality Table for males and females (ages set forward one year), with generational mortality improvements anticipated by Projection Scale AA, be retained.**

Beneficiaries: The mortality of beneficiaries applies to the survivors of members who received benefits under a joint and survivor form of payment. There is typically little data on the mortality experience of beneficiaries prior to the death of the member because there is no requirement that the death be reported. **Therefore, we recommend that standard convention be followed and mortality for beneficiaries be set on the same basis as is used for retired members.**

Disabled Members: The valuation assumes that disabled members, in general, will not live as long as retired members who met the regular service retirement eligibility. The current assumption is the RP-2000 Healthy Annuitant Mortality Tables for males and females, set forward 5 years, with generational mortality improvements anticipated by Projection Scale AA. There were 26 deaths during the study period and 45 were expected based on the current mortality table for disabled retirees. There is an insufficient number of disabled retirees to provide fully credible results, therefore, **we recommend the current mortality assumption, RP-2000 Healthy Annuitant Mortality Tables for males and females, set forward 5 years, with generational improvement anticipated by Projection Scale AA, be retained.**

Active Members: This assumption predicts eligibility for active member death benefits prior to retirement, rather than the expected lifetime for pension payments. In smaller groups, the mortality rates for active members are often set based on the same assumption as is used for healthy retirees. Given the low probability of death while active, the results cannot be credible on their own without much larger numbers of active employees than are in COPFRS. We prefer to keep the mortality assumption for active and retired members on a consistent basis. **Therefore, we recommend the current mortality assumption for active members be retained.**

SERVICE RETIREMENT

Service retirement measures the change in status from active membership directly to retirement. This assumption does not include the retirement patterns of members who terminated from active membership years prior to their retirement. A separate assumption addresses that situation.

Our study period includes calendar years 2012 through 2015. The contract with the fire union was not settled until December, 2012 and this may have impacted the retirement experience for Fire union members during 2012. As a result, the 2012 retirement experience was excluded from our study as we did not believe that it was a reliable indicator of future, long-term retirement patterns.

Changes in the 2010 Police union contract and the 2012 Fire union contract created different retirement eligibility criteria and modified the benefit structures for different groups of active members. Those differences vary between the police and fire contracts. Given the plan design for current active members, there are different assumptions used for different groups to reflect the expected retirement behavior by members covered under the various benefit structures. A summary of the retirement eligibility and benefit formulas for current Police members are summarized below:

	Police Members		
	At least 20 Years of Service at contract date	Less than 20 Years of Service at contract date	Hired after January 1, 2010
Eligible to retire with unreduced benefits	Age 45 and 20 YOS or age 55 and 10 YOS	Age 45 and 20 YOS or age 55 and 10 YOS	Age 50 and 30 YOS or age 55 and 10 YOS
Eligible to retire with reduced benefits	None	None	Age 50, but 7% reduction for each year before age 55 if less than 30 YOS
Benefit formula	10 YOS; 20% 15 YOS: 30% 20 YOS: 50% 25 YOS: 75%	10 YOS: 20% 15 YOS: 30% 20 YOS: 50% 25 YOS: 70% 30 YOS: 75%	10 YOS: 20% 15 YOS: 30% 20 YOS: 50% 25 YOS: 65% 30 YOS: 75%

The current benefit structures for Fire members are summarized below:

| | Fire Members | | |
	At least 15 Years of Service at contract date	Less than 15 Years of Service at contract date	Hired after January 1, 2013
Eligible to retire with unreduced benefits	Age 45 and 25 YOS, age 50 and 20 YOS or age 55 and 10 YOS	Age 45 and 25 YOS, age 50 and 20 YOS or age 55 and 10 YOS	Age 50 and 30 YOS or age 55 and 10 YOS
Eligible to retire with reduced benefits	None	None	Age 50, but 7% reduction for each year before age 55 if less than 30 YOS
Benefit formula	10 YOS; 20% 15 YOS: 30% 20 YOS: 55% 25 YOS: 75%	10 YOS: 20% 15 YOS: 30% 20 YOS: 50% 25 YOS: 70% 30 YOS: 75%	10 YOS: 20% 15 YOS: 30% 20 YOS: 45% 25 YOS: 55% 30 YOS: 65%

Both groups are eligible to participate in a Deferred Retirement Option Plan (DROP). In general, a member must have 25 years of service to elect DROP (certain current members have less stringent requirements). Therefore, we studied both the number of members electing DROP, as well as retirement, during the study period. We would note that the Fire contract was finalized in late 2012 so the DROP was not available before 2013 for Fire members. As noted earlier, with the concern that 2012 might not be representative of longer term retirement patterns, that year for Fire member was excluded from our analysis.

Pre-2010 Police Hires and Pre-2013 Fire Hires

The structure of the benefit formula for Police members hired before January 1, 2010 and Fire member hired before January 1, 2013 provides a strong incentive for members to remain in covered employment for 25 years and little incentive for members work beyond that point. We studied the actual retirement rates at which members elected service retirements and DROP over the study period. The current assumption, for both police and fire members, is that they will work until they reach 25 years of service and then either retire or enter DROP. Of those reaching 25 years of service, 70% are assumed to elect DROP for a period of 5 years, but not beyond age 60 and 30% are assumed to retire.

The following table is a summary of the actual service retirement and DROP experience for the period 2012 through 2015 for Police members:

Police

| Years of Service | Exposure | Retirements and DROP elections | | | Retirement / DROP Rate |
| | | Observations | | | |
		Retire	DROP	Total	
20	119	6	0	6	5%
21	105	4	0	4	4%
22	77	10	1	11	14%
23	62	2	7	9	15%
24	45	3	9	12	27%
25	20	1	17	18	90%
Total	428	26	34	60	

The pattern of actual retirements observed was very different than the current assumption which reflects no probability of retirement (0%) prior to 25 years of service and 100% probability of retirement or DROP election at 25 years of service. The actual experience indicates that while nearly all members retired (or elected DROP) by the time they reached 25 years of service, some members retired with less than 25 years of service. A similar pattern was observed in the prior experience study, but there was insufficient data to support a change at that time given recent changes in the benefit structure and unusual economic conditions during the prior study period.

The benefit structures in place for the Police members may result in different behavior in the future. The 2010 contract permitted certain members to participate in DROP with less than 25 years of service so some of the DROP experience in this study period may not continue in the future. Secondly, those members who had at least 20 years of service at the time of the 2010 contract remained under the benefit structure that provides 55% of final average pay with 20 years of service and 75% with 25 years of service, a very strong incentive for Police members in this benefit tier to remain employed until reaching 25 years of service. Most of the members eligible for this benefit structure (20 years in 2010) should have already attained 25 years of service. The benefit structure applicable to most Police members who will be retiring in the next ten to fifteen years provides 50% of final average pay with 20 years of service, 70% with 25 years of service, and 75% with 30 years of service. Although it requires 30 years of service to reach the maximum benefit of 75% of final average pay, the high benefit accruals between 20 and 25 years of service remain in this benefit structure so it seems reasonable to expect the retirement rates for this group to be similar to those observed in this study, but lower at the shorter durations. Based on the data in both the current and the prior study, we are recommending a modest change to this assumption, as shown in the graph below:

Police Retirement Experience
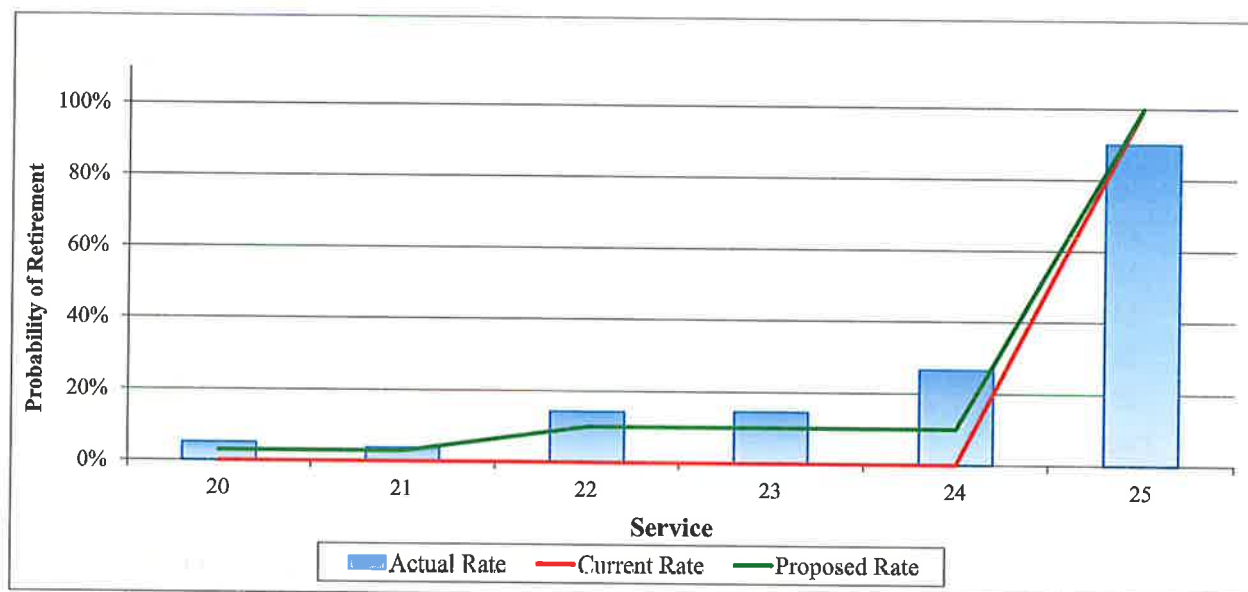
The recommended rates of retirement are 3% with 20-21 years of service, 10% with 22-24 years of service, and 100% with 25 years of service. Note that some of the members in the group with 24 years of service ultimately reach 25 years of service during the year and thus their experience should be aggregated with the experience of those with 25 years of service. The current assumption for those eligible for DROP (70%) understated the actual experience. However, under the benefit structure applicable for most of the retirees in the short term, additional benefits are earned between 25 and 30 years of service. For those with at least 20 years of service at the time of the 2010 contract, there is no incentive to work beyond attaining 25 years of service unless they elect into the DROP. Although in the current study period 85% of all those leaving who were eligible elected to participate in the DROP, we believe in the future the election percentage will be lower because some members will elect to earn a higher benefit rather than elect into DROP. Therefore, we recommend the current assumption of 70% be modified only slightly. Of those eligible for DROP, we recommend an assumption that 75% elect into the DROP for a period of five years, but not beyond age 60, and the remaining 25% retire. As additional data becomes available in future experience studies, this assumption can continue to be refined. Using the recommended assumption, the A/E ratio is 133%.

The following table is a summary of the actual service retirement and DROP experience for the period 2013 through 2015 for Fire members (note this includes only three years of data):

Fire

| Years of Service | Exposure | Retirements and DROP election | | | Retirement / DROP Rate |
		Observations			
		Retire	DROP	Total	
20	13	4	0	4	31%
21	12	4	0	4	33%
22	8	1	0	1	13%
23	13	7	2	9	69%
24	22	9	9	18	82%
25	2	2	0	2	100%
Total	70	27	11	38	

Again, the pattern of actual retirements observed was very different than the current assumption with more retirements before 25 years of service than expected (even after considering that those shown with 24 years of service may have reached 25 years during the upcoming year). The current assumption reflects no probability (0%) of retirement prior to 25 years of service and 100% probability of retirement or DROP election at 25 years of service. The actual experience indicates that while nearly all members retire (or elect DROP) by the time they reach 25 years of service, a portion of active members elect to retire with less than 25 years of service. A similar pattern was observed in the prior experience study, but there was insufficient data to support a change at that time.

The 2013 contract permitted certain members to participate in DROP with less than 25 years of service so some of the DROP experience in this period will likely not continue to occur in the long term. Secondly, those members who had at least 15 years of service at the time of the 2013 contract remained under the benefit structure that provides 55% of final average pay with 20 years of service and 75% with 25 years of service. Therefore, there is a very strong incentive for Fire members in this benefit tier to remain employed until reaching 25 years of service. This benefit structure will likely apply to most Fire members retiring in the shorter term. The benefit structure applicable to those with less than 15 years of service when the 2013 contract was passed still have a high accrual rate from 20 to 25 years of service (50% with 20 years of service increasing to 70% with 25 years of service). Although the benefit structure for those with less than 15 years at the contract date requires 30 years of service to reach the maximum benefit of 75% of final average pay, the high benefit accruals between 20 and 25 years of service remain in this benefit structure so it seems reasonable to expect the retirement rates for this group to be similar to those observed in this study. However, the rates at durations 23 and 24 are very high so we are skeptical that retirement rates in the future will be as high as those observed at those durations during this study period. Therefore, we have adjusted the retirement rates at those durations. As more data becomes available in future studies, the retirement rates can be refined.

Fire Retirement Experience
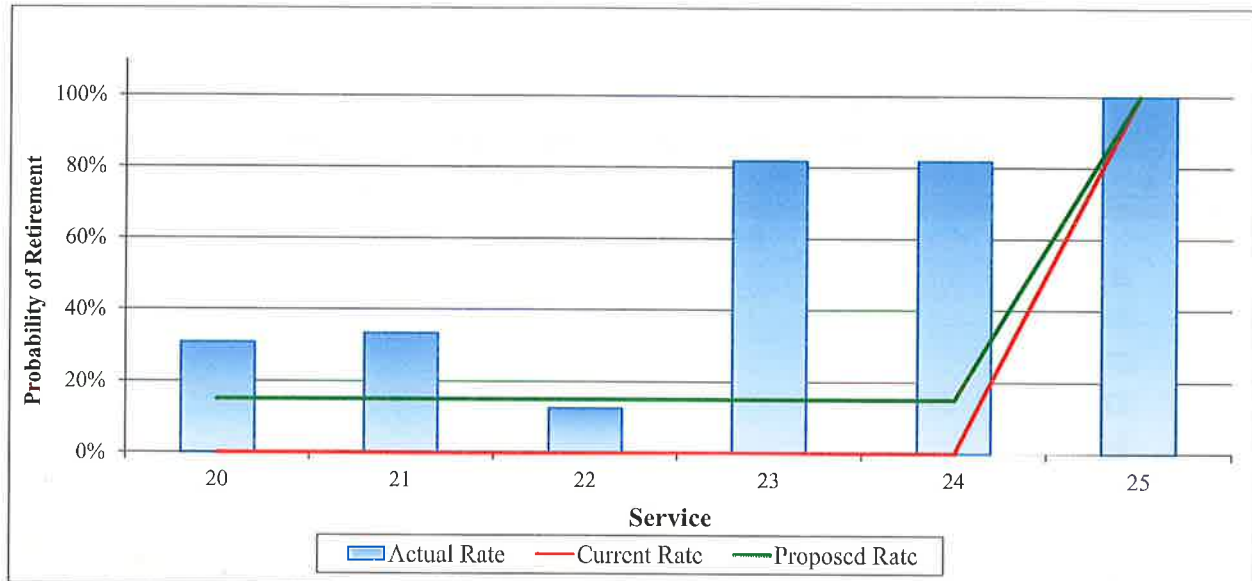
The recommended rates of retirement are 15% with 20-24 years of service and 100% with 25 years of service. Of those eligible to elect into DROP, we recommend the DROP election assumption be increased slightly from 70% to 75% to reflect the actual experience. The remaining 25% are assumed to retire. Using the recommended assumptions, the A/E ratio is a closer fit, but still well above 100%.

Post-2009 Police Hires

Police members hired after January 1, 2010 receive a pension of 65% of final average pay with 25 years of service and 75% with 30 years of service. The normal retirement age for this group, which permits retirement with unreduced retirement benefits, is age 50 with 30 years of service or age 55 with 10 years of service. Benefits may commence at age 50, but if the member has less than 30 years of service a 7% reduction to the benefit amount applies for each year the benefit starts prior to age 55. Given the benefit structure which provides the maximum benefit of 75% of final average pay at 30 years of service and the applicable reduction for benefit commencement before reaching 30 years of service (if under age 55), we expect that most members will work until they reach 30 years of service. The 7% reduction for each year of early commencement is intended to be actuarially equivalent to the amount of the benefit payable at normal retirement age. This somewhat offsets the cost impact of members retiring earlier than assumed. Therefore, we recommend the retirement assumption for the post-2009 Police hires be set to the normal retirement age, i.e., the earlier of age 50 and 30 years of service or age 55 and 10 years of service.

The DROP is only available for those members who have at least 25 years of service. Given the fact that members in this group will still be accruing benefits of 2% per year of service from 25 to 30 years of service and a reduction would apply if less than age 55, it is unlikely that many will elect into the DROP before reaching 30 years of service. By the time members have worked 30 years, it is less likely they will elect to participate in DROP. Because of all of the uncertainty, we recommend no specific assumption regarding DROP be used at this time.

It will be many years before there is any credible retirement experience for the police members hired after January 1, 2010. Until such time we must rely on our professional judgment in setting this assumption.

Post-2012 Fire Hires

The benefit structure Fire members hired after December 31, 2012 is different than that applicable to Police members hired after December 31, 2009. The Fire benefit structure provides for a lower ultimate benefit when the member reaches 30 years of service (65% of final average salary), but it is similar to the Police benefit structure in that the benefit accrual from 25 to 30 years of service is 2% per year (from 55% of final average salary to 65%). As a result, we believe it is reasonable to expect Fire members in this benefit tier to exhibit similar retirement patterns as Police members hired after 2009. In addition, the same uncertainty exists as far as members electing to participate in the DROP with less than 30 years of service. Because of this uncertainty, we recommend no specific assumption regarding DROP be used at this time.

Given the benefit structure reaches the maximum benefit of 65% of final average pay at 30 years of service and the applicable reduction for commencement before reaching 30 years of service (if less than age 55), we expect that most members will work until they reach 30 years of service. The 7% reduction for each year of early commencement is intended to be actuarially equivalent to the amount of the benefit payable at normal retirement age. This somewhat offsets the cost impact of members retiring earlier than assumed. Therefore, we recommend the retirement assumption for the post-2012 Fire hires be the normal retirement age, i.e., the earlier of age 50 and 30 years of service or age 55 and 10 years of service.

Inactive Vested Members: The current assumption is that inactive vested members will retire at their first eligible retirement date. There are few such members so no reliable data is available to evaluate this assumption. However, it is reasonable to expect most, if not all, of these members to retire at their earliest retirement date. **We recommend keeping the current assumption that benefits for inactive vested members will commencement at the earliest retirement date. It is a reasonable assumption and provides a conservative estimate of the liability for inactive vested members.**

DISABILITY

The size of the System, coupled with the small probability of disablement at most ages, does not permit credible derivation of disability rates based solely on the System's experience. Nonetheless, the actual to expected ratio was calculated as a general indicator of how well the assumption anticipated the actual experience. The following table shows both the experience in the current and prior study using the current assumption.

Disabilities			
	Observations		**A/E Ratio**
	Actual	Expected	
2007-2011	18	37	49%
2012-2015	8	25*	32%
Total	26	62	42%

The number of disabilities was much lower than expected in this experience study. Given the size of the group, volatility is not unexpected so we want to be cautious is making any changes as future experience could result in a higher number of disabilities than expected.

We also analyzed the actual versus expected experience separately by group, i.e. Police and Fire. The following table summarizes those results:

Disabilities (2012-2015)			
	Observations		**A/E Ratio**
	Actual	Expected	
Police	6	14	43%
Fire	2	12	17%
Total	8	26*	32%

* Do not match due to rounding

The findings were similar to those observed in the last study, i.e., Fire members had lower rates of disability. The disparity was greater in this study than the last study where the A/E ratio was 55% for Police and 41% for Fire. However, the size of the total group is quite small so further splitting it into two smaller groups for an assumption that has a low probability of occurrence does not seem to be an improvement in the process of analyzing the data. Therefore, we recommend the aggregate experience continue to be used to develop one assumption applicable for both groups.

The probability of disability was reduced in the last experience study with rates set so that the A/E ratio was 60% (18 actual compared to 30 expected), providing a margin for adverse deviation. Given that the observed experience in this study period continues to show fewer disabilities than expected, **we are recommending that the current disability rates be reduced by 20%. The A/E ratio using the new assumption is 40% so anticipated disabilities are still well above the actual experience (20 expected versus 8 actual), thus continuing to provide some margin for adverse deviation in the future.**

TERMINATION OF EMPLOYMENT

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, retirement, or disability. Rates of termination can vary by both age and years of service. In general, rates of termination tend to be highest at younger ages and in the early years of employment. The current termination of employment rates are age-based.

In the prior experience study, the A/E ratio using the current assumption was 61% (34 actual terminations compared to 56 expected). However, that study period (2007 through 2011) included several years of difficult economic conditions that may have impacted the observed experience. The last experience study was the first time that the termination of employment assumption was evaluated separately for Police and Fire members. That analysis indicated that the Fire group exhibited much lower termination rates than the Police members (90% A/E ratio for Police versus 24% for Fire). Given the limited data and credibility concerns about that study period, no change in the assumption was made to develop separate assumptions for the two groups.

We continued to analyze termination experience separately by group in this study. The following table summarizes our findings, for ages 25 to 45, based on the current assumption:

| | Terminations | | |
| | Observations | | A/E Ratio |
	Actual	Expected	Current
Police	29	22	132%
Fire	8	16	50%
Total	37	38	97%

During the current study period, the observed termination rates for Fire members were much lower than those of Police members. This is consistent with the findings of the prior experience study. Due to the material differences in the termination patterns between the two groups and the different benefit structures, we believe that separate termination of employment assumptions for Police and Fire members will provide a better measurement of the System's liabilities. Therefore, we are recommending that new assumptions be developed for each membership group. Since our recommendation is to modify this assumption, we also analyzed the experience using a service-based assumption rather than the current age-based assumption. In most jobs, there tends to be a very strong correlation between years of service and termination of employment with the rates of termination declining as years of service increase. This data indicated a similar pattern with lower termination rates with increasing years of service. The number of terminations is low in both groups, but particularly in the Fire group, so volatility in the actual rates is to be expected.

The actual experience and proposed service-based assumption are shown in the following graphs.

Proposed Police Termination Rates
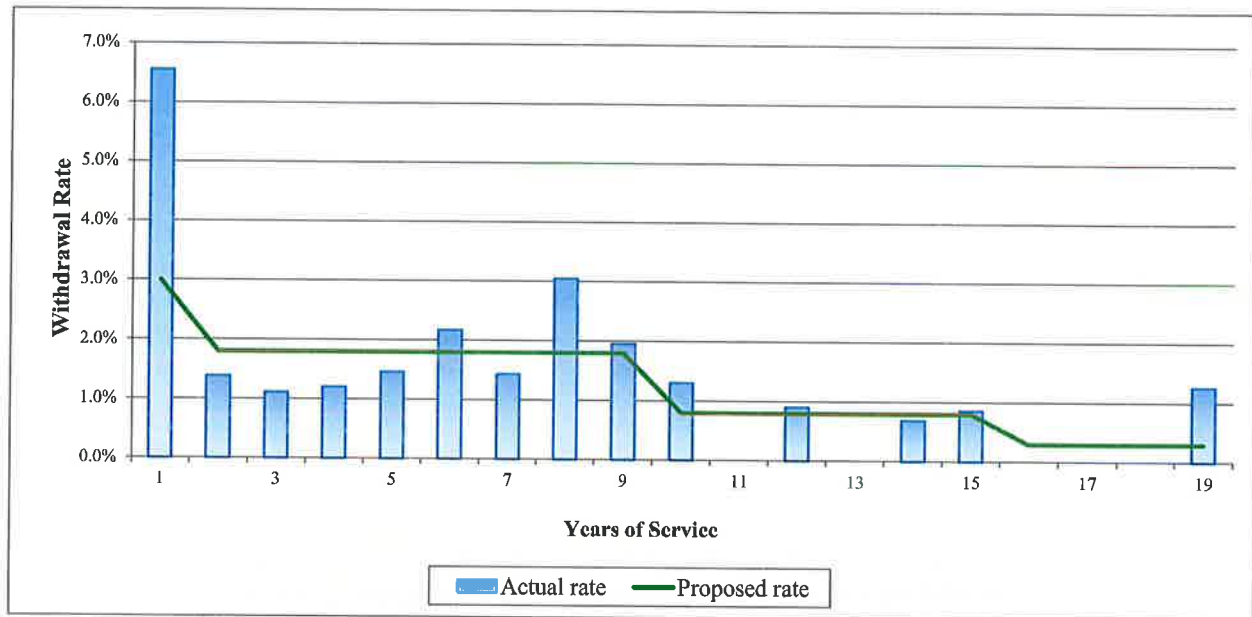
Proposed Fire Termination Rates
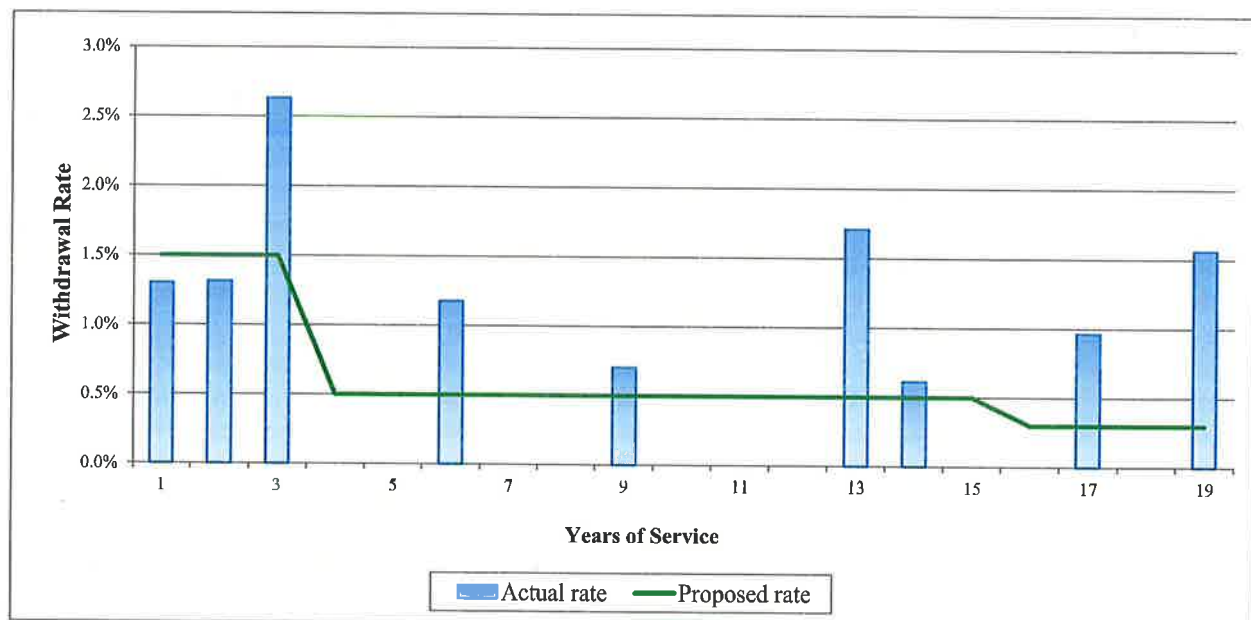
Our recommendation is to adopt the recommended termination of employment assumptions which are service-based and vary by group (Police vs Fire). The revised A/E ratios using the recommended assumptions are 90% for Fire (11 actual vs 12.3 expected) and 101% for Police (32 actual vs 31.8 expected).

SALARY INCREASE ASSUMPTION

Estimates of future salaries are based on assumptions for two types of increases:

1. Increases in each individual's salary due to promotion or longevity (often called merit scale), and

2. Increases in the general wage level of the membership, which are directly related to price and wage inflation.

Earlier in this report, we recommended that the second of these rates, general wage inflation be changed from 4.00% to 3.25% (2.50% price inflation and 0.75% real wage growth).

As noted above, future salary increases are the result of two components. Actual salary experience is reported in total, rather than by components, so the experience study typically reviews total salary increases during the study period. The economic environment during this study period continued to exhibit considerable pressure on government budgets to reduce expenses as revenues have not totally rebounded from the Great Recession. As a result, salary increases for many public employees have continued to be very low. In our study, we compared individual salary increases for any members active in any two consecutive periods (e.g. 2012 and 2013, 2013 and 2014, etc.). The salary data provided to the actuary changed during the study period which distorted the year to year comparison of actual salary data. In addition, there were years that included back pay that also created challenges in analyzing the actual salary data in the study period. Therefore, the actual pay increases during the study period were not directly used in developing our recommendations for this assumption.

The current merit salary increase assumption is service-based and varies by group (Police vs Fire). The assumptions were developed in the last experience study, based on the pay scales in use at that time under the bargaining contracts for each group. For Police members, the pay scale reflected nine steps (A through I) starting with entry as a probationary police officer (Step T). At that time, the movement from Step T through Step E required one year at each Step and movement to Steps F through I required two years resulting in a police officer reaching Step I thirteen years after graduation from the Academy.

The most recent contract for members of the Police union modified the requirements to move through the pay scale (Step T through I), effective in 2018. Only one year is now required to move between each step including Step F through Step I (which were previously two years) for Police Officers. Similar acceleration in the movement through the pay scale steps were made for Police Sergeants and Captains. This modification to the pay scales impacts the merit scale for years of service 6 through 13 and some adjustment to the merit scale is appropriate to reflect this change. Our recommendation reflects a similar progression through the pay steps as the current scale, but accomplishes the movement in nine years rather than 13 years.

In the last experience study, when the pay scales for Fire members were studied, we observed that the pay scales were different than the Police pay scales which is why different assumptions are used for each group. In general, for Fire there are seven steps, A through G, for both firefighters and fire apparatus engineers. Movement between each step occurs after 12 months other than the move from Step T (probationary firefighter) to Step A which occurs after 6 months. Based on our review of the pay scales in the most recent labor contract for the Fire union, the movement through the steps is unchanged from the data used to create the merit scale assumption in the last study. Therefore, we believe it is reasonable to maintain the current merit salary scale for Fire members.

Under the building block approach, the total salary increase assumption is the sum of the wage inflation assumption and the merit salary scale. With the proposed decrease in the wage inflation assumption from 4.00% to 3.25%, the total salary increase assumption will also decline by 75 basis points.

Our recommendation is to maintain the merit scale component of the salary increase assumption for Fire members and modify the merit scale component of the salary increase assumption for Police members, as discussed above.

Merit Component of Salary Increase Assumption

Year of Service	Police Members		Fire Members	
	Current	Proposed	Current	Proposed
0	10.00%	12.00%	5.00%	5.00%
1	9.00%	10.00%	5.00%	5.00%
2	7.00%	9.00%	5.00%	5.00%
3	5.00%	6.00%	5.00%	5.00%
4	2.20%	5.00%	4.75%	4.75%
5	2.20%	4.00%	4.50%	4.50%
6	2.20%	3.25%	4.25%	4.25%
7	2.20%	3.25%	4.00%	4.00%
8	2.20%	3.25%	3.00%	3.00%
9	2.00%	2.00%	2.00%	2.00%
10	2.00%	1.20%	1.00%	1.00%
11	2.00%	0.96%	1.00%	1.00%
12	2.00%	0.75%	1.00%	1.00%
13	1.50%	0.50%	1.00%	1.00%
14	1.25%	0.50%	1.00%	1.00%
15	1.00%	0.50%	1.00%	1.00%
16	0.75%	0.50%	1.00%	1.00%
17 - 20	0.50%	0.50%	0.00%	0.00%
21 - 23	0.25%	0.25%	0.00%	0.00%
24	0.00%	0.00%	0.00%	0.00%

MISCELLANEOUS ASSUMPTIONS

Final Year Wage Adjustment

Plan provisions for both Police and Fire members use a high three-year average to determine final average pay and average overtime hours over a member's entire career (career overtime average referred to as COTA). The COTA hours are provided to the actuary in the census data each year. The actual regular pay, as reported, is adjusted to reflect the current COTA hours and that salary is used to project future benefits. We believe the current method of using the actual COTA is a reasonable way to estimate the impact of the COTA on the ultimate retirement benefit and **we recommend it be retained**.

Interest Credited on Member Contributions

Annually, the Board sets the interest rate on member contributions each year, given the minimum rate in the ordinance of 1% and the maximum of 5%. The current assumption is 3.25%. Given that the Board has discretion to determine the rate each year, the current assumption is still reasonable and we recommend it be retained.

Other Minor Assumptions

While we did not specifically collect data to review the following assumptions, we believe the current assumptions remain reasonable and should be continued.

	Current Assumption
• % of total disabilities that are service-related	85%
• Medical expenses for disabilities in line of duty	5% load on current and future disabled liabilities
• % married at death or retirement	75%
• % with dependents at death of active member	75%
• Average number of children per married member	1
• Age difference, if unknown	Females are 3 years younger than males

Based on data reported to us by the city, all disabilities (8) that occurred in the study period from January 1, 2012 to December 31, 2015 were service related. In the prior study, 86% of the disabilities were service-related. Given the small number of disabilities, some variability in the percentage that are service-related is not unusual. **We believe the current assumption of 85% is reasonable and should be retained.**

There is significant variability in the size of medical payments for disabilities from year to year, but based on the actual experience over the last four years, the current load appears to be a reasonable estimate.

While we did not include the other minor assumptions in our review of actual experience in the study period, we believe the current assumptions are reasonable and should continue to be used. Changes in these assumptions would have a relatively minor impact of the liabilities and costs of the System.

APPENDIX A – CURRENT ACTUARIAL ASSUMPTIONS

Investment Return:	8.00% per year, (net of investment expenses)
Inflation:	3.25%
Payroll Growth:	4.00%
Salary Increases:	Merit increases based on service plus a general wage increase
Service Retirement Age:	Graduated rates based on service
Mortality:	
Active Members	RP-2000 Employee Table projected with generational improvements using Scale AA, set forward one year
Service Pensioners and Beneficiaries	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward one year
Disabled	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward five years
Disability:	Graduated Rates by age. See table on next page
Percent of Disabilities in Line of Duty:	85%
Medical Expenses for Disabilities in Line of Duty:	5% load on liability for current and future disabled members.
Percent Married at Death or Retirement:	75%
Spouse Age Difference:	Husbands assumed to be 3 years older than wives
Termination of Employment:	Graduated rates by age. See table on next page
COTA Adjustment:	Members are assumed to retire with their current COTA
Decrement Timing:	Middle of year

SAMPLE RATES

Age on 1/1/2010	Annual Mortality Rates		Current Age	Annual Disability Rates	Annual Turnover Rates
	Males	Females			
20	.03%	.02%	20	.21%	1.41%
30	.05	.03	30	.24	1.69
40	.10	.07	40	.42	.63
50	.19	.15	50	.76	.00
60	.46	.41	60	1.16	.00

Salary Progression - Police

Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	3.25%	0.75%	9.0%	13.0%
5	3.25%	0.75%	2.2	6.2
10	3.25%	0.75%	2.0	6.0
15	3.25%	0.75%	1.0	5.0
20	3.25%	0.75%	0.5	4.5
25	3.25%	0.75%	0.0	4.0

Salary Progression – Fire

Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	3.25%	0.75%	5.0%	9.0%
5	3.25%	0.75%	4.5	8.5
10	3.25%	0.75%	1.0	5.0
15	3.25%	0.75%	1.0	5.0
20	3.25%	0.75%	0.0	4.0

Retirement Rates

Assumed retirement rates for Police members hired before January 1, 2010 and Fire members hired before January 1, 2013 are as follows:

Years of Service	Distribution	Annual Rate
Less than 25	0.0%	0.0%
25	100.0	100.0

If a member was hired after age 37, then it is assumed that member would retire at the later of age 62 or 10 years of service.

Assumed retirement rates for Police members hired after January 1, 2010 and Fire members hired after January 1, 2013 are as follows:

Years of Service	Distribution	Annual Rate
Less than 30	0.0%	0.0%
30	100.0	100.0

If a member was hired after age 30, then it is assumed that member would retire at the later of age 60 or 10 years of service.

DROP Participation Rate: 70% of retirement-eligible members are assumed to enter DROP

DROP Period: 5 years, but not beyond age 60

Interest Credited to DROP Accounts: 4% annually

APPENDIX B – PROPOSED ACTUARIAL ASSUMPTIONS

Investment Return:	7.75% per year, (net of investment expenses)
Inflation:	2.50%
Payroll Growth:	3.25%
Salary Increases:	Merit increases based on service plus a general wage increase
Service Retirement Age:	Graduated rates based on service
Mortality:	
Active Members	RP-2000 Employee Table projected with generational improvements using Scale AA, set forward one year
Service Pensioners and Beneficiaries	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward one year
Disabled	RP-2000 Healthy Annuitant Table projected with generational improvements using Scale AA, set forward five years
Disability:	Graduated Rates by age. See table on next page
Percent of Disabilities in Line of Duty:	85%
Medical Expenses for Disabilities in Line of Duty:	5% load on liability for current and future disabled members.
Percent Married at Death or Retirement:	75%
Spouse Age Difference:	Husbands assumed to be 3 years older than wives
Turnover:	Graduated rates by age. See table on next page
COTA Adjustment:	Members are assumed to retire with their current COTA
Decrement Timing:	Middle of year

SAMPLE RATES Annual Rates		
Age on 1/1/2010	**Mortality**	
	Males	Females
20	.03%	.02%
30	.05	.03
40	.10	.07
50	.19	.15
60	.46	.41

SAMPLE RATES Annual Rates	
Current Age	**Disability**
20	.17%
30	.19
40	.33
50	.61
60	.92

SAMPLE RATES Annual Rates		
Years of Service	**Turnover**	
	Police	Fire
1	3.0%	1.5%
5	1.8	0.5
10	0.8	0.5
15	0.8	0.5
20	0.0	0.0

SAMPLE RATES Salary Progression – Police				
Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.75%	10.00%	13.25%
5	2.50%	0.75%	4.00%	7.25%
10	2.50%	0.75%	1.20%	4.45%
15	2.50%	0.75%	0.50%	3.75%
20	2.50%	0.75%	0.50%	3.75%
25	2.50%	0.75%	0.00%	3.25%

SAMPLE RATES Salary Progression – Fire				
Years of Service	Inflation	Productivity	Merit & Longevity	Total Increase
1	2.50%	0.75%	5.00%	8.25%
5	2.50%	0.75%	4.50%	7.75%
10	2.50%	0.75%	1.00%	4.25%
15	2.50%	0.75%	1.00%	4.25%
20	2.50%	0.75%	0.00%	3.25%

Assumed retirement rates for Police members hired before January 1, 2010 and Fire members hired before January 1, 2013 are as follows:

SAMPLE RATES Annual Rates		
Years of Service	Retirement	
	Police	Fire
20	3%	15%
21	3	15
22	10	15
23	10	15
24	10	15
25	100	100

If a member has years of service listed above, but is age 62 or older, they are assumed to retire immediately.

Assumed retirement rates for Police members hired <u>after</u> January 1, 2010 and Fire members hired <u>after</u> January 1, 2013 are the earlier of **Age 50 and 30 Years of Service** or **Age 55 and 10 Years of Service**.

DROP Participation Rate:	75% of retirement-eligible members are assumed to enter DROP
DROP Period:	5 years, but not beyond age 60
Interest Credited to DROP Accounts:	4% annually

Moderate Growth Inputs - 2017

Assumes 2% inflation rate and Moderate Growth Supercycle and Moderate Growth Economic Environment

Asset Class	Expected Return	Standard Deviation	Geometric Return
Large Cap Stocks	7.9	19.5	6.1
Mid Cap Stocks	9.7	22.5	5.3
Small Cap Stocks	9.5	24.5	5.7
Micro Cap Stocks	9.5	27.0	6.1
International Stocks	9.6	21.0	7.6
International Small Cap Stocks	10.0	25.0	7.1
Global Developed	8.5	20.1	5.5
Emerging Markets Stocks	13.6	25.5	10.5
Public REITS	6.5	18.5	4.9
Energy Infrastructure	10.0	21.0	8.0
Commodities	5.7	19.0	4.0
Cash	1.7	1.5	1.7
TIPS	2.1	5.0	1.9
Short Bonds	1.0	3.2	0.9
Intermediate Bonds	1.4	4.3	1.3
Long Bonds	2.4	11.0	1.3
Bank Loans	4.4	7.3	4.1

	Expected Return	Standard Deviation	Geometric Return
High Yield	6.0	10.5	5.5
International Bonds	0.0	8.5	-0.4
Emerging Market Debt	5.5	11.0	5.0
Hedge Funds Conservative	4.2	6.0	4.0
Hedge Funds Strategic	5.9	9.5	5.5
Hedge Diversified	5.1	7.3	4.9
RE - Core	5.7	9.0	5.3
RE - Value Added	7.3	13.5	5.4
Timber	6.5	8.0	6.0
Private Equity	10.2	16.2	9.0
Buyouts	10.0	13.0	9.1
Venture Capital	12.4	25.0	9.6
Mezzanine	7.4	15.0	6.3
Distressed Debt	9.0	15.0	8.0
Private Debt	6.1	8.0	5.9
Secondary Private Equity	11.0	15.2	9.9
Global Tactical	7.0	13.4	5.4

Asset Class Correlation

(Correlation matrix, asset classes 1–34)

Asset Class	1	2	3	4	5	6	7	8	9	10
1. Large Cap Stocks	1.00									
2. Mid Cap Stocks	0.95	1.00								
3. Small Cap Stocks	0.91	0.95	1.00							
4. Micro Cap Stocks	0.88	0.91	0.98	1.00						
5. International Stocks	0.81	0.85	0.79	0.80	1.00					
6. International Small Cap Stocks	0.80	0.82	0.81	0.82	0.94	1.00				
7. Global Developed	0.96	0.92	0.85	0.84	0.94	0.90	1.00			
8. Emerging Markets Stocks	0.79	0.80	0.72	0.73	0.88	0.85	0.87	1.00		
9. Public REITS	0.67	0.70	0.72	0.71	0.65	0.65	0.66	0.54	1.00	
10. Energy Infrastructure	0.46	0.53	0.45	0.48	0.42	0.41	0.47	0.49	0.47	1.00

APPENDIX C – DEMARCHE CAPITAL MARKET ASSUMPTIONS

Secular Inputs – 2017

Assumes 2.7% long-term inflation rate.

Asset Class	Expected Return	Standard Deviation	Geometric Return
Large Cap Stocks	9.3	17.0	8.0
Mid Cap Stocks	9.3	19.5	8.1
Small Cap Stocks	10.7	23.0	9.3
Micro Cap Stocks	11.1	25.0	8.0
International Stocks	9.5	20.0	8.0
International Small Cap Stocks	10.9	24.0	8.3
Global Developed	9.5	18.5	7.9
Emerging Markets Stocks	11.5	27.0	8.5
Public REITS	9.5	19.5	7.9
Energy Infrastructure	10.2	20.0	6.6
Commodities	5.3	20.0	3.1
Cash	3.1	1.5	3.1
TIPS	4.7	5.0	4.5
Short Bond	4.2	4.0	4.1
Intermediate Bonds	5.1	5.1	5.0
Long Bond	5.6	9.7	5.2
Bank Loans	5.3	9.0	5.0

Asset Class	Expected Return	Standard Deviation	Geometric Return
High Yield	7.1	10.0	7.2
International Bonds	5.3	10.5	4.8
Emerging Market Debt	7.3	11.0	5.0
Hedge Funds Conservative	5.7	6.0	5.5
Hedge Funds Strategic	7.1	9.0	7.3
Hedge Funds Diversified	6.7	8.0	5.4
RE - Core	7.9	7.0	7.7
RE - Value Added	9.4	11.0	8.3
Timber	7.0	8.5	6.7
Private Equity	11.8	13.5	11.0
Buyouts	11.1	12.0	11.1
Venture Capital	13.9	22.0	11.5
Mezzanine	9.3	10.5	9.3
Distressed Debt	10.7	10.5	10.2
Private Debt	11.2	8.0	6.1
Secondary Private Equity	5.6	15.2	10.2
Global Tactical	5.3	15.0	7.2

Asset Class Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1. Large Cap Stocks	1.00																																	
2. Mid Cap Stocks	0.92	1.00																																
3. Small Cap Stocks	0.88	0.95	1.00																															
4. Micro Cap Stocks	0.88	0.91	0.98	1.00																														
5. International Stocks	0.74	0.71	0.64	0.80	1.00																													
6. International Small Cap Stocks	0.67	0.68	0.72	0.82	0.90	1.00																												
7. Global Developed	0.92	0.85	0.80	0.85	0.94	0.88	1.00																											
8. Emerging Markets Stocks	0.69	0.72	0.74	0.77	0.73	0.71	0.73	1.00																										
9. Public REITS	0.57	0.60	0.62	0.52	0.45	0.43	0.56	0.45	1.00																									
10. Energy Infrastructure	0.36	0.39	0.45	0.45	0.35	0.33	0.31	0.34	0.30	1.00																								
11. Commodities	0.20	0.25	0.30	0.28	0.31	0.29	0.31	0.31	0.11	0.48	1.00																							
12. Cash	-0.03	0.01	0.02	-0.14	-0.02	-0.17	-0.03	-0.01	-0.09	0.05	0.11	1.00																						
13. TIPS	-0.23	-0.20	-0.27	-0.25	-0.17	-0.25	-0.20	-0.09	0.05	0.06	0.31	0.15	1.00																					
14. Short Bond	0.06	0.08	0.02	-0.45	0.08	0.06	0.06	-0.07	-0.07	0.12	0.50	0.24	0.45	1.00																				
15. Intermediate Bonds	0.09	0.08	0.07	-0.40	0.13	0.16	0.10	-0.08	0.09	0.10	0.24	0.13	0.68	0.39	1.00																			
16. Long Bond	0.11	0.04	0.07	-0.36	0.13	0.18	-0.17	-0.01	-0.17	0.09	0.09	0.24	0.58	0.45	0.91	1.00																		
17. Bank Loans	0.54	0.55	0.52	0.58	0.57	0.57	0.54	0.52	0.50	0.17	-0.01	-0.05	-0.31	-0.05	-0.16	-0.23	1.00																	
18. High Yield	0.53	0.51	0.51	0.58	0.54	0.64	0.59	0.59	0.55	0.14	0.14	-0.05	-0.02	0.14	0.13	0.09	0.94	1.00																
19. International Bonds	-0.07	-0.11	-0.13	-0.11	0.06	0.13	0.12	0.09	-0.07	0.15	0.17	0.15	0.55	0.30	0.55	0.50	-0.11	0.07	1.00															
20. Emerging Market Debt	0.43	0.50	0.48	0.44	0.61	0.60	0.40	0.61	0.39	0.23	0.23	0.07	0.30	0.07	0.25	0.21	0.50	0.50	0.04	1.00														
21. Hedge Funds Conservative	0.55	0.57	0.51	0.54	0.55	0.66	0.62	0.60	0.47	0.19	0.25	0.02	-0.19	0.02	-0.15	-0.17	0.51	0.51	-0.06	0.37	1.00													
22. Hedge Funds Strategic	0.57	0.58	0.57	0.77	0.55	0.65	0.60	0.61	0.34	0.24	0.31	0.06	-0.02	0.03	-0.03	-0.03	0.43	0.32	-0.12	0.37	0.79	1.00												
23. Hedge Funds Diversified	0.65	0.60	0.61	0.68	0.59	0.61	0.09	0.73	0.31	0.15	0.41	0.13	-0.13	-0.04	-0.21	-0.23	0.51	0.51	-0.17	0.34	0.90	0.84	1.00											
24. RE - Core	0.09	0.09	0.05	0.11	0.07	0.08	0.08	0.15	0.05	0.17	0.17	0.34	-0.05	-0.12	-0.11	-0.04	0.15	0.18	-0.05	0.24	0.34	0.34	0.30	1.00										
25. RE - Value Added	0.09	0.06	0.05	0.11	0.08	0.08	0.08	0.12	0.09	0.24	0.24	0.24	0.23	-0.12	-0.15	-0.11	0.34	0.75	-0.11	0.24	0.24	0.29	0.24	0.93	1.00									
26. Timber	0.02	0.00	-0.05	-0.09	0.03	0.03	0.03	-0.11	0.16	-0.05	-0.08	0.37	0.23	0.15	0.15	0.12	-0.11	0.18	-0.05	0.04	0.15	0.20	0.30	-0.01	-0.08	1.00								
27. Private Equity	0.55	0.55	0.53	0.53	0.41	0.41	0.51	0.29	0.15	0.29	0.29	0.06	0.10	-0.05	-0.05	-0.05	0.33	0.59	0.33	0.27	0.71	0.55	0.49	0.25	0.25	0.14	1.00							
28. Buyouts	0.57	0.58	0.57	0.77	0.55	0.56	0.56	0.30	0.14	0.42	0.42	0.10	0.15	0.04	-0.12	-0.14	0.40	0.52	0.40	0.42	0.85	0.44	0.56	0.34	0.34	0.12	0.93	1.00						
29. Venture Capital	0.44	0.42	0.44	0.74	0.39	0.29	0.07	0.34	0.14	0.13	0.13	-0.07	0.05	-0.17	-0.07	-0.07	0.14	0.14	-0.13	0.54	0.54	0.54	0.54	0.30	0.30	0.14	0.45	0.40	1.00					
30. Mezzanine	0.33	0.35	0.34	0.34	0.29	0.42	0.50	0.22	0.11	0.20	0.20	0.03	0.05	0.11	-0.31	0.31	0.27	0.18	-0.13	0.17	0.51	0.42	0.54	0.30	0.30	0.04	0.28	0.28	0.23	1.00				
31. Distressed Debt	0.60	0.55	0.70	0.70	0.50	0.57	0.67	0.56	0.55	0.49	0.49	0.16	0.13	-0.05	-0.26	-0.17	0.59	0.75	-0.17	0.50	0.82	0.59	0.49	-0.11	-0.11	-0.11	0.14	0.14	0.14	0.29	1.00			
32. Private Debt	0.54	0.55	0.54	0.58	0.54	0.57	0.52	0.46	0.30	0.29	0.06	0.06	0.61	-0.13	-0.15	-0.22	0.33	0.84	-0.11	0.32	0.65	0.59	0.49	-0.04	-0.04	-0.11	0.17	0.51	0.27	0.53	0.33	1.00		
33. Secondary Private Equity	0.55	0.55	0.55	0.58	0.39	0.39	0.50	0.30	0.10	0.29	0.29	0.06	0.09	-0.10	-0.05	-0.05	0.33	0.52	-0.05	0.37	0.71	0.54	0.49	0.25	0.25	0.14	0.95	0.93	0.51	0.53	0.14	0.51	1.00	
34. Global Tactical	0.55	0.57	0.54	0.64	0.55	0.68	0.60	0.45	0.47	0.25	0.25	0.25	0.08	-0.19	-0.17	-0.17	0.55	0.51	-0.17	0.48	0.95	0.79	0.90	0.24	0.24	0.15	0.71	0.75	0.54	0.51	0.71	0.51	0.71	1.00

EXHIBIT D-1
Retirement - Police

	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	60	20	45
Actual/Expected		300%	133%

EXHIBIT D-2
Retirement - Fire

	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	38	2	12
Actual/Expected		1900%	317%
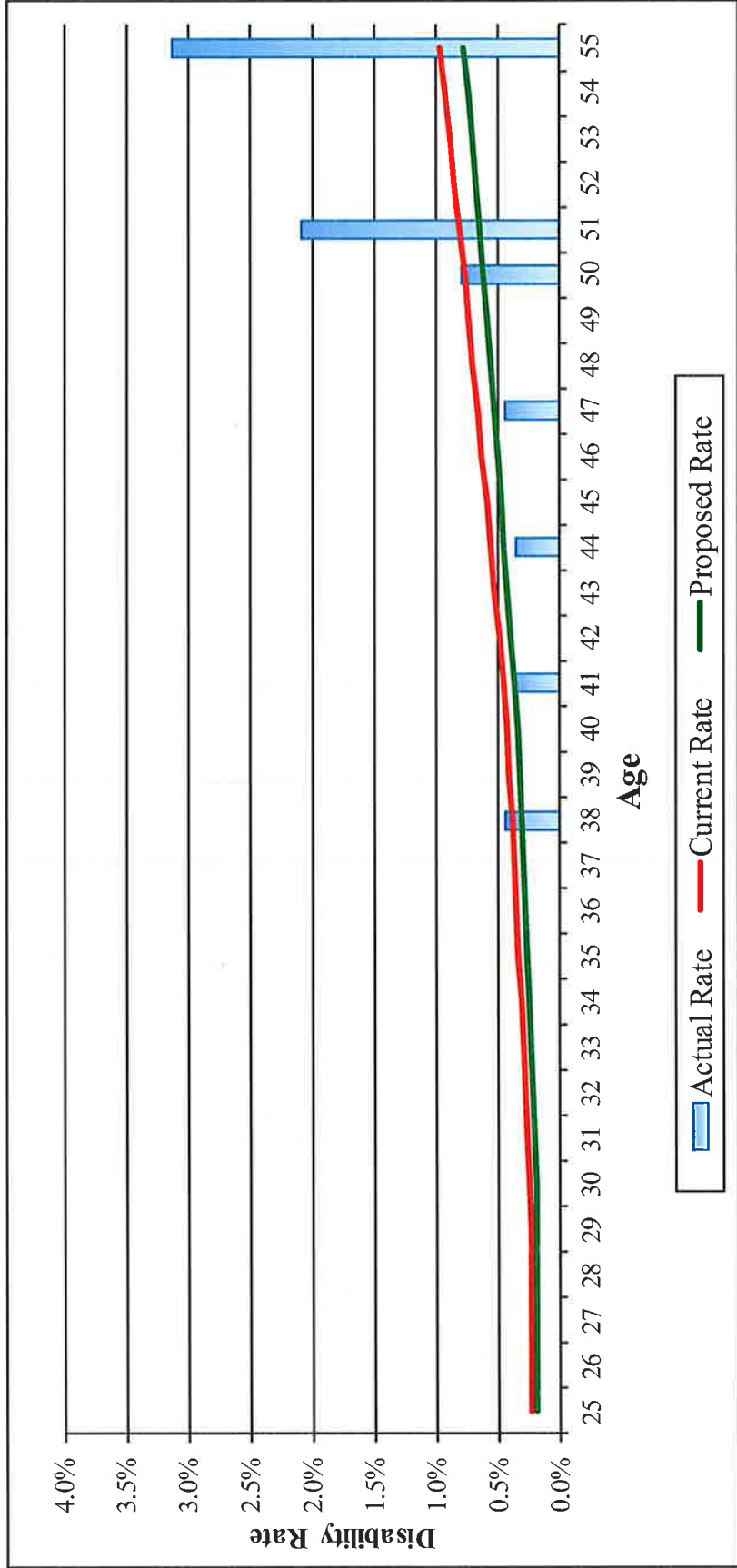
EXHIBIT D-3
Disability

	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	8	25	20
Actual/Expected		32%	40%

EXHIBIT D-4
Termination - Police
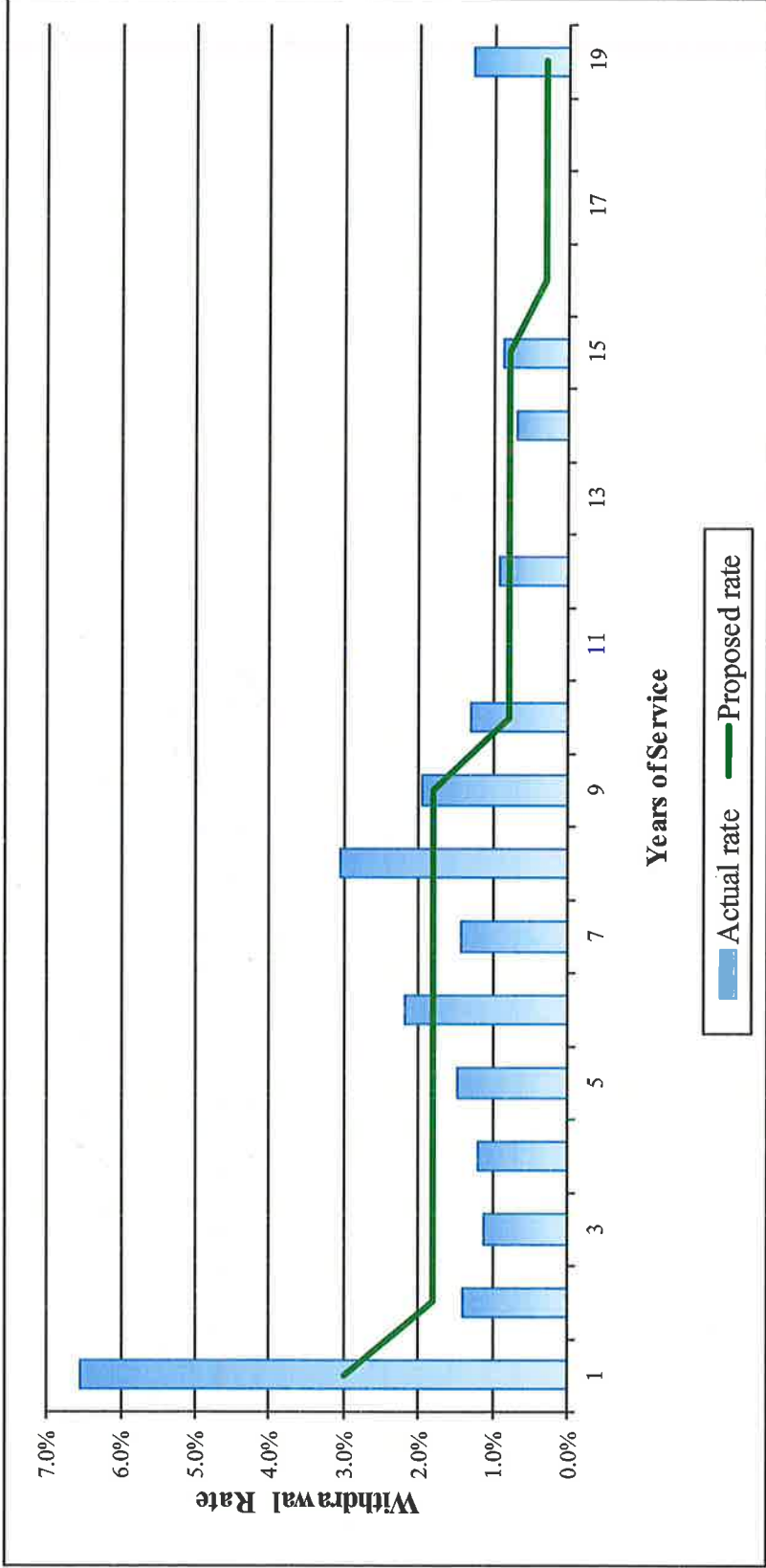
	Actual	Expected - Proposed Assumptions
Total Count	32	31.8
Actual/Expected		101%

EXHIBIT D-5
Termination - Fire

Years of Service

Withdrawal Rate

— Actual rate — Proposed rate
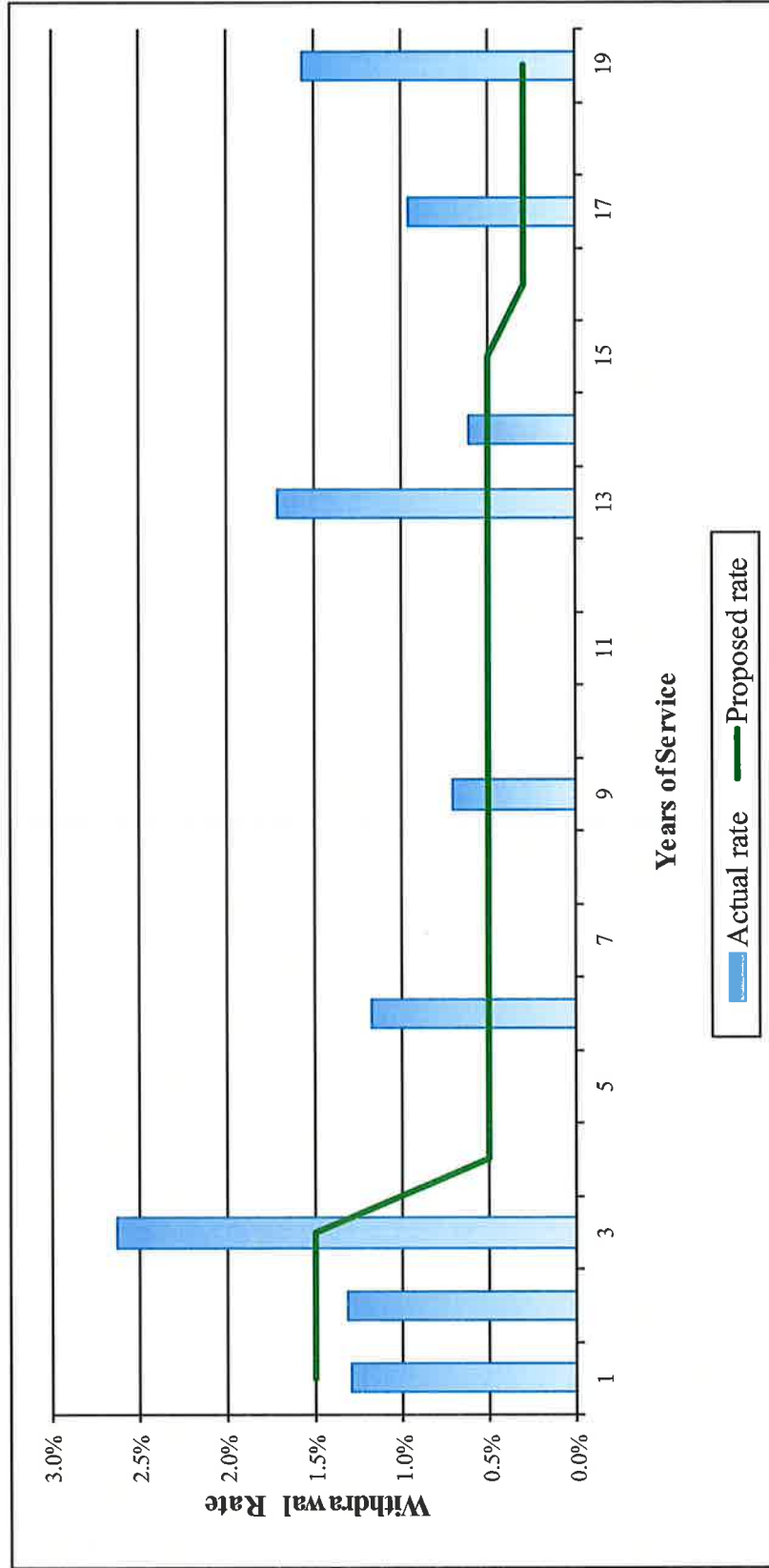
	Actual	Expected - Proposed Assumptions
Total Count	11	12.3
Actual/Expected		90%

EXHIBIT E-1
Retirement - Police

Duration	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
20	119	6	5.042%	-	0.000%	3.6	3.000%
21	105	4	3.810%	-	0.000%	3.2	3.000%
22	77	11	14.286%	-	0.000%	7.7	10.000%
23	62	9	14.516%	-	0.000%	6.2	10.000%
24	45	12	26.667%	-	0.000%	4.5	10.000%
25	20	18	90.000%	20.0	100.000%	20.0	100.000%
	428	60	14.019%	20.0	4.673%	45.2	10.561%

EXHIBIT E-2
Retirement - Fire

Duration	Exposure	Actual Retirements	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
20	13	4	30.769%	-	0.000%	2.0	15.000%
21	12	4	33.333%	-	0.000%	1.8	15.000%
22	8	1	12.500%	-	0.000%	1.2	15.000%
23	13	9	69.231%	-	0.000%	2.0	15.000%
24	22	18	81.818%	-	0.000%	3.3	15.000%
25	2	2	100.000%	2.0	100.000%	2.0	100.000%
	70	60	14.019%	2.0	2.857%	12.3	17.571%

EXHIBIT E-3
Disability

Age	Exposure	Actual Disabilities	Actual Rate	Current Expected	Current Rate	Proposed Expected	Proposed Rate
25	40	-	0.000%	0.1	0.222%	0.1	0.178%
26	66	-	0.000%	0.1	0.225%	0.1	0.180%
27	95	-	0.000%	0.2	0.228%	0.2	0.182%
28	123	-	0.000%	0.3	0.230%	0.2	0.184%
29	146	-	0.000%	0.3	0.233%	0.3	0.187%
30	156	-	0.000%	0.4	0.236%	0.3	0.189%
31	183	-	0.000%	0.5	0.254%	0.4	0.203%
32	190	-	0.000%	0.5	0.272%	0.4	0.218%
33	199	-	0.000%	0.6	0.290%	0.5	0.232%
34	202	-	0.000%	0.6	0.308%	0.5	0.246%
35	208	-	0.000%	0.7	0.326%	0.5	0.261%
36	214	-	0.000%	0.7	0.344%	0.6	0.275%
37	225	-	0.000%	0.8	0.362%	0.7	0.290%
38	234	1	0.427%	0.9	0.380%	0.7	0.304%
39	230	-	0.000%	0.9	0.398%	0.7	0.318%
40	251	-	0.000%	1.0	0.416%	0.8	0.333%
41	280	1	0.357%	1.3	0.450%	1.0	0.360%
42	291	-	0.000%	1.4	0.485%	1.1	0.388%
43	294	-	0.000%	1.5	0.519%	1.2	0.415%
44	284	1	0.352%	1.6	0.554%	1.3	0.443%
45	247	-	0.000%	1.5	0.588%	1.2	0.470%
46	236	-	0.000%	1.5	0.622%	1.2	0.498%
47	228	1	0.439%	1.5	0.657%	1.2	0.525%
48	202	-	0.000%	1.4	0.691%	1.1	0.553%
49	164	-	0.000%	1.2	0.726%	1.0	0.581%
50	126	1	0.794%	1.0	0.760%	0.8	0.608%
51	96	2	2.083%	0.8	0.800%	0.6	0.640%
52	79	-	0.000%	0.7	0.839%	0.5	0.671%
53	71	-	0.000%	0.6	0.879%	0.5	0.703%
54	51	-	0.000%	0.5	0.918%	0.4	0.735%
55	32	1	3.125%	0.3	0.958%	0.2	0.766%
	5,443	8	0.147%	25.3	0.464%	20.2	0.371%

EXHIBIT E-4
Termination - Police

Duration	Exposure	Actual Terminations	Actual Rate	Proposed Expected	Proposed Rate
1	61	4	6.557%	1.8	3.000%
2	72	1	1.389%	1.3	1.800%
3	90	1	1.111%	1.6	1.800%
4	166	2	1.205%	3.0	1.800%
5	205	3	1.463%	3.7	1.800%
6	184	4	2.174%	3.3	1.800%
7	209	3	1.435%	3.8	1.800%
8	164	5	3.049%	3.0	1.800%
9	153	3	1.961%	2.8	1.800%
10	153	2	1.307%	1.2	0.800%
11	126	-	0.000%	1.0	0.800%
12	110	1	0.909%	0.9	0.800%
13	144	-	0.000%	1.2	0.800%
14	144	1	0.694%	1.2	0.800%
15	116	1	0.862%	0.9	0.800%
16	132	-	0.000%	0.4	0.300%
17	95	-	0.000%	0.3	0.300%
18	114	-	0.000%	0.3	0.300%
19	79	1	1.266%	0.2	0.300%
	2,517	32	1.271%	31.8	1.264%

EXHIBIT E-5
Termination - Fire

Duration	Exposure	Actual Terminations	Actual Rate	Proposed Expected	Proposed Rate
1	77	1	1.299%	1.2	1.500%
2	76	1	1.316%	1.1	1.500%
3	38	1	2.632%	0.6	1.500%
4	80	-	0.000%	0.4	0.500%
5	149	-	0.000%	0.7	0.500%
6	170	2	1.176%	0.9	0.500%
7	131	-	0.000%	0.7	0.500%
8	130	-	0.000%	0.7	0.500%
9	142	1	0.704%	0.7	0.500%
10	122	-	0.000%	0.6	0.500%
11	162	-	0.000%	0.8	0.500%
12	150	-	0.000%	0.8	0.500%
13	117	2	1.709%	0.6	0.500%
14	163	1	0.613%	0.8	0.500%
15	143	-	0.000%	0.7	0.500%
16	129	-	0.000%	0.4	0.300%
17	104	1	0.962%	0.3	0.300%
18	71	-	0.000%	0.2	0.300%
19	64	1	1.563%	0.2	0.300%
	2,218	11	0.496%	12.3	0.553%

Appendix F

Omaha Public Power District
Retirement Plan Information

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2018 Reporting Form for Underfunded

Political Subdivision Pension Plans

Omaha Public Power District

1. Please list the following information for plan years 2013 through current plan year 2018:

   a. Funding Status – There are currently multiple ways to identify and value funded status. For your consideration, the district is aware of two and they are as follows:

      i. **Present Value of Accrued Plan Benefits**: present value of benefits based on compensation and service to the date of the actuarial valuation.

Funded Ratio	2013	2014	2015	2016	2017	2018
PVAPB (%)	83.0	85.2	82.7	76.4	76.0	76.7

      ii. **Actuarial Accrued Liability**: present value of retirement benefits adjusted for assumptions for future increases in compensation and service attributable to past accounting periods.

Funded Ratio	2013	2014	2015	2016	2017	2018
AAL (%)	71.9	73.9	72.4	69.2	69.0	70.0

   b. Assumed rate of return – The discount rate of return is itemized in the table below:

	2013	2014	2015	2016	2017	2018
Discount Return %	7.75	7.75	7.75	7.0	7.0	7.0

   c. Actual investment return – The actual return is itemized in the table below:

	2013	2014	2015	2016	2017	2018
Actual Return %	11.94	3.85	-1.07	6.74	16.49	Not Yet Available

d. Member and employer contributions rates - percentage

	2013	2014	2015	2016	2017	2018
Employee Contributions (%)	6.2	6.2	6.2	6.2	6.2	6.7

The OPPD percentage rate is calculated by dividing the Annual Required Contribution into the Valuation Compensation as follows:

	2013	2014	2015	2016	2017	2018
Employer Contributions (%)	27.8	27.3	23.7	25.2	28.3	29.8

e. Normal cost – percentage

	2013	2014	2015	2016	2017	2018
Covered Compensation (%)	11.8	11.6	11.8	11.1	11.4	12.1

f. Actuarial required contribution – percentage & dollar amount

Assumed percentage of covered compensation

	2013	2014	2015	2016	2017	2018
ARC (%)	27.8	27.3	23.7	25.2	28.3	29.8

Dollar amount in millions

	2013	2014	2015	2016	2017	2018
ARC ($)	52.4	53.0	46.6	50.7	53.1	53.6

g. Actuarially required contribution - actual dollars contributed and percentage of actuarial required contribution actually contributed

	2013	2014	2015	2016	2017	2018
ARC ($) actually made	52.4	53.0	46.6	50.7	53.1	53.6
ARC Made (%)	100	100	100	100	100	Not Yet Available

2. Please provide a brief narrative of the circumstances that led to the current underfunding of the retirement plan.

> The primary reasons for the pension's present funding level are lower investment performance from 2000-2008, increase in mortality tables due to longer life expectancy, and reduction of the plan's projected earnings rate (discount rate). All of these items have impacted the funding status for the universe of defined benefit plans.

3. Have there been any changes in the actuarial methods and/or assumptions since the previous actuarial valuation report? If so, please describe.

> The District adopted an updated mortality table in 2018.

4. Please provide a description of corrective actions implemented to improve the funding status of the plan including, but not limited to, benefit changes, increased contribution rates and/or employer contributions. Include any actuarial projections based on these changes.

   a. In 2012, the OPPD Board of Directors approved a change in the retirement benefit for employees hired after December 31, 2012. Employees hired on January 1, 2013 and later are no longer eligible for the monthly annuity benefit and are only eligible for a cash balance payment at retirement. In addition to providing more convenience to future employees, there was a decrease in actuarially projected plan costs which is expected to reduce future pension costs.
   b. In 2013, the District changed early retirement eligibility, which generally prevents employees from receiving early retirement benefits before the age of 55.
   c. The employee contribution rate increased from 6.2% to 6.7% in 2018, 7.2% in 2019, 7.7% in 2020, 8.3% in 2021 and 9.0% in 2022 and later.

5. Please describe any recent or ongoing negotiations with bargaining groups that may impact the funding of the plan.

> Negotiations occur on an ongoing basis. The current negotiations with the District's unions were completed in 2017. As a result of the negotiations, employee contributions to the retirement plan will gradually increase beginning in 2018 at 6.7% through 2022 at 9.0%.

6. When was the most recent Actuarial Experience Study conducted on the plan? Please attach a copy of the most recent Actuarial Experience Study.

   The most recent Actuarial Experience Study was completed in 2016 and was provided with the submittal on October 14, 2016.

7. What is the current assumed rate of return? If the rate has been changed in the past year, or if there are plans to review the rate for the upcoming year, please describe.

   The discount rate is currently 7.0%.

8. Please attach the most recent actuarial valuation report. If the valuation report is completed biannually (or less often) please include an updated report for the interim year/s, if available.

   The January 1, 2018 actuarial valuation report is attached.

OPPD

Omaha Public Power District

October 15, 2018

Senator Mark Kolterman, Chairperson
Nebraska Retirement Systems Committee
Nebraska Legislature
State Capitol
P. O. Box 94604
Lincoln, NE 68509-4604

RE: Neb. Rev. Stat. § 13-2402 - Reporting Requirements - Defined Benefit Plans

Dear Senator Kolterman:

I am responding on behalf of the Omaha Public Power District ("OPPD") to your letter of September 7, 2018 regarding reporting requirements pursuant to Section 13-2402 of the Nebraska Revised Statutes. This letter, and the enclosed attachments, provide the information requested in your September 7th letter.

OPPD has provided and will continue to disclose information describing the organization's defined benefit Retirement Plan to the Board of Directors, in annual reports, in bond offering documents, and in annual newsletters provided to plan participants. We are pleased to provide similar information to the Nebraska Retirement Systems Committee.

As requested, OPPD's Chief Financial Officer, L. Javier Fernandez, will appear before the Committee on December 3rd to present the information requested by the Committee and answer questions about OPPD's defined benefit plan status.

If you have any further questions, or need additional information, please do not hesitate to contact me.

Thank you for the opportunity to present this information to the Committee.

Sincerely,

Timothy J. Burke
President and Chief Executive Officer

Actuarial Report

Omaha Public Power District

Retirement Plan

As of January 1, 2018

Contents

Introduction

This report documents the results of the January 1, 2018 actuarial valuation of the Omaha Public Power District (OPPD) Retirement Plan for the plan sponsor and for Omaha Public Power District. The information provided in this report is intended strictly for documenting information relating to contribution and funding requirements for the 2018 plan year.

Determinations for purposes other than the funding valuation may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. This plan is a governmental plan as defined in IRC section 414(d), and as such the plan is not subject to the ERISA minimum funding requirements.

Future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or 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); and
- Changes in plan provisions or applicable law.
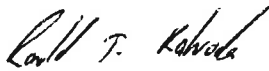
Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by Omaha Public Power District as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.
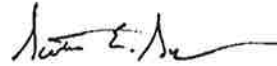
The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. Omaha Public Power District selected the economic and demographic assumptions. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to Omaha Public Power District has any material direct or indirect financial interest in Omaha Public Power District. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for Omaha Public Power District.

Ronald J. Kalvoda, FSA, EA
Aon

Scott E. Syverson, EA, MAAA
Aon

October 2018

Summary

The following page summarizes the results of the January 1, 2018 actuarial valuation. For comparison purposes, the results of the January 1, 2017 and January 1, 2016 actuarial valuations are also shown.

This plan is a governmental plan as defined in IRC section 414(d), and as such the Plan is not subject to the ERISA minimum funding requirements.

Plan Changes

The January 1, 2018 valuation results reflect the following plan changes:

- The employee contribution rate increased from 6.2% to 6.7% in 2018, 7.2% in 2019, 7.7% in 2020, 8.3% in 2021 and 9.0% in 2022 and later.
- The cash balance pay credit schedule increased beginning in 2018 from the current 7%-16% schedule to a 10%-16% schedule by 2022. See the Plan Provisions section for additional detail.

Assumption Changes

The January 1, 2018 valuation results reflect the following assumption changes:

- The mortality table for healthy participants was updated from the RP-2014 Aggregate table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2016 with generational projection to the RP-2014 Aggregate table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2017 with generational projection.
- The mortality table for disabled participants was updated from the RP-2014 Disabled Retiree table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2016 with generational projection to the RP-2014 Disabled Retiree table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2017 with generational projection.
- The retirement rates and withdrawal rates applicable to Fort Calhoun participants were updated to reflect current "decommissioning" and "SafStor" forecasts.

Method Changes

There have been no method changes since the prior valuation.

Summary

	January 1, 2016	January 1, 2017	January 1, 2018
Interest Rate	7.00%	7.00%	7.00%
Present Value of Future Benefits ("PVB")	$ 1,588,967,348	$ 1,628,055,120	$ 1,661,954,554
Accrued Liability (EAN)	$ 1,406,958,596	$ 1,443,717,502	$ 1,476,147,956
Actuarial Value of Assets	973,844,079	995,616,705	1,033,752,901
Unfunded Accrued Liability	$ 433,114,517	$ 448,100,797	$ 442,395,055
Gross Normal Cost	$ 22,251,621	$ 21,416,629	$ 21,651,698
As Percentage of Covered Compensation	11.08%	11.42%	12.06%
Annual Required Contribution ("ARC")[1]	$ 50,711,451	$ 53,072,549	$ 53,562,735
As Percentage of Covered Compensation	25.24%	28.29%	29.82%
Number of Participants			
Retired and Beneficiaries	1,992	2,086	2,154
Terminated and Vested	352	400	466
Disabled	30	32	28
Active	2,200	1,968	1,828
Total	4,574	4,486	4,476
Valuation Compensation[2]	$ 200,905,242	$ 187,605,084	$ 179,607,099

[1] Adjusted to reflect timing of contributions.
[2] Expected compensation during the plan year for active participants under the 100% assumed retirement age.

Funding Requirements

The Funding Requirements section presents the results of the ongoing plan valuation, which determines the contribution levels.

Included in the Funding Requirements are the following sections:

- *Assets and Liabilities*—This section develops the basic quantities upon which the actual contributions are based
- *Contributions*—This section shows the development of the contribution amount for the year
- *Experience*—This section develops and analyzes the actuarial gain or loss during the past year

This plan is a governmental plan as defined in IRC section 414(d), and as such the plan is not subject to the ERISA minimum funding requirements.

Assets and Liabilities

The Asset and Liabilities section includes the following:

- *Unfunded Accrued Liability and Normal Cost*—The actuarial valuation determines the unfunded accrued liability and the normal cost of the plan for the current year. The contribution then consists of the normal cost plus a payment on the unfunded accrued liability, if any.

- For employees already retired or terminated with a vested pension, the benefits to be paid have been determined. For other employees, future benefit payments based on service and projected pay must be estimated. As of the current valuation date, these liabilities have been valued as shown on the following pages.

- *Development of the Actuarial Value of Assets*—The actuarial valuation determines an actuarial value of assets, which has been adjusted to smooth out any significant annual changes in the market value of assets.

Valuation Results

The following table shows the basic valuation results as of January 1, 2018, both before and after changes.

	Before Changes	After Changes
Accrued Liability		
Retirees and Beneficiaries	$ 940,186,687	$ 935,334,174
Terminated Vested	33,201,352	33,032,106
Active and Disabled Employees	516,169,601	507,781,676
Total	$ 1,489,557,640	$ 1,476,147,956
Actuarial Value of Assets	1,033,752,901	1,033,752,901
Unfunded Accrued Liability	$ 455,804,739	$ 442,395,055
Funded Ratio	69.4%	70.0%
Gross Normal Cost	$ 21,156,012	$ 21,651,698
Number of Participants		
Retired and Beneficiaries		2,154
Terminated Vested		466
Disabled		28
Active		1,828
Total		4,476
Valuation Compensation[1]		$ 179,607,099

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[1] Expected compensation during the plan year for active participants under the 100% assumed retirement age.

Market Value of Assets

Market Value, 12/31/2017	$	1,020,385,607
Receivable for 2017 Plan Year		0
Market Value of Assets, 1/1/2018	$	1,020,385,607

Actuarial Value of Assets

The actuarial value of assets is determined assuming the prior year's value grew at the valuation interest rate and then adjusted 20% toward the market value of assets on the valuation date.

Actuarial Value, 1/1/2017	$	995,616,705
OPPD Contributions for 2017		53,072,549
Employee Contributions for 2017		10,890,197
Benefit Payments in 2017		(91,372,009)
Interest on Above at 7.00% to 12/31/2017		68,887,282
Expected Value of Assets, 1/1/2018	$	1,037,094,724
Adjustment 20% Toward Market Value		(3,341,823)
Actuarial Value of Assets, 1/1/2018	$	1,033,752,901

A loss of $3,341,823 was realized from the plan's asset experience. The return on the market value of assets during the 2017 Plan Year was approximately 16.04%. The return on the actuarial value (which smoothes prior years' gains and losses) was 6.68%, compared to the 7.00% assumed in 2017.

Contributions

This section includes the calculation of the Annual Required Contribution ("ARC") applicable to the 2018 plan year. The ARC is determined based on OPPD's funding policy. The funding policy is based on the following:

- Entry age normal cost method
- 20-year fresh start of the unfunded accrued liability as of January 1, 2015
- One-year amortization of the increase in accrued liability due to certain plan amendments, including single-year ad hoc retiree cost-of-living adjustments
- 20-year amortization of other plan or assumption changes and actual gains or losses
- Amortizations are closed group amortizations based on level amounts

Annual Required Contribution for 2018

Gross Normal Cost, 1/1/2018	$	21,651,698
Expected Employee Contributions during 2018		(12,033,676)
Net Amortization Charges, 1/1/2018		41,945,040
Interest at 7.00% to 12/31/2018		4,030,593
Total Charges at 12/31/2018	$	55,593,655
Discount for Monthly Contributions		(2,030,920)
Annual Required Contribution for 2018 Plan Year—Adjusted for Assumed Monthly Contributions	$	53,562,735

Schedule of Amortization Payments to be Recognized in the Annual Required Contribution

OPPD has elected to amortize all future gains/losses and plan amendments over a period of 20 years.

Source	Date Established	Original Amount	Remaining Years	Present Value 1/1/2018	Payment Due 1/1/2018
2015 Fresh Start	1/1/2015	$ 361,570,248	17	$ 333,874,183	$ 31,959,932
2016 Plan Amendment	1/1/2016	1,268,369	18	1,204,324	111,893
2016 Assumption Changes	1/1/2016	50,292,679	18	47,753,232	4,436,704
2016 (Gain)/Loss	1/1/2016	28,105,800	18	26,686,643	2,479,429
2017 Assumption Changes	1/1/2017	(1,501,900)	19	(1,465,264)	(132,494)
2017 (Gain)/Loss	1/1/2017	27,887,279	19	27,207,027	2,460,151
2018 Plan Amendment	1/1/2018	949,609	20	949,609	83,772
2018 Assumption Changes	1/1/2018	(14,359,293)	20	(14,359,293)	(1,266,744)
2018 (Gain)/Loss	1/1/2018	20,544,594	20	20,544,594	1,812,397
Total				$ 442,395,055	$ 41,945,040

Experience

This section presents the development and analysis of the actuarial gain/loss during the past year. Gains or losses result when actual plan experience over the prior year differs from the Actuarial Assumptions.

Development of Actuarial Gain or Loss for 2017

Unfunded Accrued Liability (Surplus), 1/1/2017	$	448,100,797
Plus: Interest to 12/31/2017 at 7.00%		31,367,056
Plus: 2017 Total Normal Cost		21,416,629
Plus: Interest to 12/31/2017 at 7.00%		1,499,164
Less: 2017 OPPD Contributions		(53,072,549)
Less: Interest to 12/31/2017 at 7.00%		(2,010,976)
Less: 2017 Employee Contributions		(10,890,197)
Less: Interest to 12/31/2017 at 7.00%		(381,157)
Equals: Expected Unfunded Accrued Liability (Surplus), 1/1/2018	$	436,028,767
Less: Actual Unfunded Accrued Liability (Surplus) Before Changes, 1/1/2018		455,804,739
Equals: Actuarial Gain (Loss) for 2018 Plan Year	$	(19,775,972)

Reconciliation of Unfunded Accrued Liability (Surplus)

Unfunded Accrued Liability (Surplus) Before Changes, 1/1/2018	$	455,804,739
Change in Unfunded Due to Plan Amendment		949,609
Change in Unfunded Due to Assumption Change		(14,359,293)
Change Due to Retiree Cost of Living Adjustment (COLA)		0
Actual Unfunded Accrued Liability (Surplus), 1/1/2018	$	442,395,055

Accrued Benefit Values

This section presents the results of a separate valuation of the plan's obligations, based only on benefits accrued as of the valuation date of January 1, 2018. The focus of this valuation differs from the calculation of ongoing funding requirements, which anticipates benefits to be earned by future service and salary increases. This accrued benefit valuation assumes an ongoing plan and, therefore, differs from a calculation of termination liabilities which would be based on the benefits and assumptions appropriate for a terminating plan.

The American Academy of Actuaries, in Actuarial Standards of Practice Number 4, has provided recommended procedures for the calculation of the Present Value of Vested Accrued Benefits and the Present Value of Accrued Benefits. The results under both illustrations include the sum of the present value of:

- All benefits expected to be paid to former participants and their beneficiaries; and
- Benefits expected to be paid at a future date to present active participants, based on only service and pay prior to the date of calculation.

The *Present Value of Vested Accrued Benefits* recognizes only the benefits in which an active participant retains a right, independent of continuation of employment, beyond the calculation date. It does not include any additional benefits which might arise because of future death or disability that would not become payable if the participant had terminated employment before the occurrence of the death or disability.

The *Present Value of All Accrued Benefits* recognizes All Accrued Benefits expected to become payable at future dates, including the accrued portion of disability and preretirement death benefits. Thus, the accrued benefit of a non-vested participant is included in this calculation to the extent it will become payable (i.e., vest) upon the occurrence of a future event such as termination, death, disability, or retirement.

The accrued benefit used in these calculations is based on the personnel data supplied by OPPD.

The interest rate used in these calculations is the same as the funding interest rate.

Vested Accrued Benefits, 1/1/2018

Retired and Beneficiaries	$ 935,334,174
Terminated Vested	33,032,106
Active and Disabled Employees	311,133,643
Total Vested	$ 1,279,499,923
Non-vested Benefits, 1/1/2018	68,339,344
Total Accrued Benefits, 1/1/2018	$ 1,347,839,267
Interest Rate Used for These Calculations	7.00%

Historical Accrued Benefit Values and Funded Ratios

Valuation Date	Interest Rate	Accrued Benefit Value	Actuarial Assets	Funded Ratio	Market Assets	Funded Ratio
1/1/2018	7.00%	$ 1,347,839,267	$1,033,752,901	76.7%	$1,020,385,607	75.7%
1/1/2017	7.00%	$ 1,309,514,839	$ 995,616,705	76.0%	$ 904,819,988	69.1%
1/1/2016	7.00%	$ 1,274,917,795	$ 973,844,079	76.4%	$ 869,489,088	68.2%
1/1/2015	7.75%	$ 1,147,857,404	$ 949,166,647	82.7%	$ 903,563,000	78.7%
1/1/2014	7.75%	$ 1,063,458,429	$ 905,699,590	85.2%	$ 886,689,000	83.4%
1/1/2013	7.75%	$ 1,027,634,931	$ 852,552,291	83.0%	$ 800,941,000	77.9%
1/1/2012	7.75%	$ 985,638,320	$ 805,762,548	81.8%	$ 711,973,000	72.2%
1/1/2011	7.75%	$ 929,439,034	$ 771,588,331	83.0%	$ 707,943,000	76.2%
1/1/2010	8.00%	$ 854,121,013	$ 733,227,289	85.8%	$ 636,262,350	74.5%
1/1/2009	8.00%	$ 782,059,197	$ 698,111,470	89.3%	$ 505,449,000	64.6%
1/1/2008	8.20%	$ 702,387,775	$ 695,741,868	99.1%	$ 659,737,600	93.9%
1/1/2007	8.20%	$ 653,802,476	$ 656,473,880	100.4%	$ 635,020,300	97.1%
1/1/2006	8.20%	$ 609,284,807	$ 611,924,676	100.4%	$ 574,286,900	94.3%
1/1/2005	8.40%	$ 553,591,549	$ 577,885,164	104.4%	$ 549,264,200	99.2%
1/1/2004	8.40%	$ 515,350,617	$ 545,565,278	105.9%	$ 508,132,200	98.6%
1/1/2003	8.50%	$ 476,951,308	$ 519,723,240	109.0%	$ 433,102,700	90.8%
1/1/2002	8.75%	$ 425,266,689	$ 544,184,070	128.0%	$ 494,471,300	116.3%

Historical Actuarial Accrued Liabilities and Funded Ratios

Valuation Date	Interest Rate	Actuarial Accrued Liability	Actuarial Assets	Funded Ratio	Market Assets	Funded Ratio
1/1/2018	7.00%	$ 1,476,147,956	$1,033,752,901	70.0%	$1,020,385,607	69.1%
1/1/2017	7.00%	$ 1,443,717,502	$ 995,616,705	69.0%	$ 904,819,988	62.7%
1/1/2016	7.00%	$ 1,406,958,596	$ 973,844,079	69.2%	$ 869,489,088	61.8%
1/1/2015	7.75%	$ 1,310,736,895	$ 949,166,647	72.4%	$ 903,563,000	68.9%
1/1/2014	7.75%	$ 1,224,899,093	$ 905,699,590	73.9%	$ 886,689,000	72.4%
1/1/2013	7.75%	$ 1,184,996,831	$ 852,552,291	71.9%	$ 800,941,000	67.6%
1/1/2012	7.75%	$ 1,155,410,379	$ 805,762,548	69.7%	$ 711,973,000	61.6%
1/1/2011	7.75%	$ 1,094,908,920	$ 771,588,331	70.5%	$ 707,943,000	64.7%
1/1/2010	8.00%	$ 1,018,913,896	$ 733,227,289	72.0%	$ 636,262,350	62.4%
1/1/2009	8.00%	$ 963,324,892	$ 698,111,470	72.5%	$ 505,449,000	52.5%
1/1/2008	8.20%	$ 868,897,940	$ 695,741,868	80.1%	$ 659,737,600	75.9%
1/1/2007	8.20%	$ 819,314,262	$ 656,473,880	80.1%	$ 635,020,300	77.5%
1/1/2006	8.20%	$ 771,906,685	$ 611,924,676	79.3%	$ 574,286,900	74.4%
1/1/2005	8.40%	$ 702,300,052	$ 577,885,164	82.3%	$ 549,264,200	78.2%
1/1/2004	8.40%	$ 658,260,260	$ 545,565,278	82.9%	$ 508,132,200	77.2%
1/1/2003	8.50%	$ 614,382,408	$ 519,723,240	84.6%	$ 433,102,700	70.5%
1/1/2002	8.75%	$ 548,292,461	$ 544,184,070	99.3%	$ 494,471,300	90.2%

Personnel Information

The actuarial valuation was based on personnel data supplied by OPPD. The first of the following tables contains a summary of the total participant group as of January 1, 2018. For comparison purposes, the January 1, 2017 figures are also shown.

Age and service have been determined for each participant in years and completed months as of the valuation date.

Number of Participants

	January 1, 2017	January 1, 2018
Retired and Beneficiaries	2,086	2,154
Terminated Vested	400	466
Disabled	32	28
Active	1,968	1,828
Total	4,486	4,476

Personnel Characteristics of Active Participants as of January 1, 2018

	Number	Average Age	Average Years of Service	Average Entry Age	Average Pay
Male	1,463	45.6	14.7	30.9	—
Female	365	47.7	14.4	33.3	—
Total	1,828	46.0	14.6	31.4	$ 93,743

Characteristics for Inactive Participants

	Number	Average Age	Average Annual Benefit[1]
Retired and Beneficiaries	2,154	70.2	$ 42,354
Terminated Vested	466	50.1	$ 29,604

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[1] Does not include terminated vested participants under the cash balance formula.

Distribution of Personnel

The following pages provide graphical and statistical summaries of the personnel data. Included are the following:

- A grid which presents the distribution of active participants by age and service.
- A bar chart which presents the distribution of active participants by five-year age groupings.
- A bar chart which presents the distribution of active participants currently age 55 or older by five-year groupings of expected service at age 65.

These charts and graphs are useful tools for analyzing many different characteristics of the current participants of the plan. When compared to prior years' valuations, trends in the active participant population can also be observed.

**DISTRIBUTION OF PERSONNEL
BY AGE AND YEARS OF SERVICE**

Omaha Public Power District

Active Employee

- This distribution shows personnel by age last birthday and completed years of service as of 01/01/2018. For instance, the cell at age 25 and 2 years of service contains 4 employees.

- Individual careers progress along a diagonal (stair-step) line; e.g., all employees commencing service at age 25 appear on the diagonal which starts at age 25 with 0 service and runs through 26 and 1, 27 and 2, etc.

- The average age and service of this group is 46.0, 14.6.

Distribution of Personnel by Age

Age:	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Number	1	21	95	181	266	260	256	322	299	107	20	1,828
Average Service	0.1	1.7	4.8	7.5	10.1	12.0	15.2	19.3	21.2	19.8	22.2	14.6

Detail of Employees 55 & Over

Age	55	56	57	58	59	60	61	62	63	64	65	66+
Number	89	69	48	49	44	34	31	20	10	12	4	16
Average Service	20.2	22.5	23.0	18.4	22.5	19.1	19.0	21.3	18.4	22.4	23.7	21.9

Distribution of Personnel
By Expected Service At Age 65
(Based Upon Personnel Age 55 And Over)

Service:	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+	Total
Number	3	13	42	63	60	64	49	83	49	0	426
Average Service At Age 65*	3.8	8.0	12.4	17.7	22.4	27.4	32.6	37.5	41.8	0.0	27.3

* Or Current
Age if Older

Plan Provisions

Plan Name	Omaha Public Power District Retirement Plan.
Effective Date	The original Plan became effective December 31, 1945. The plan was restated effective January 1, 1997, and last amended during 2017.
Plan Year	Calendar year.
Eligibility	Full-time employees become eligible upon date of employment.
Participation	Each eligible employee shall immediately become a participant. A part-time employee may elect not to become a member. As of January 1, 2013 for non-union 763 employees and May 31, 2013 for union 763 employees, all new hires receive cash balance benefits.

Final Average Pay Formula Provisions

Normal Retirement

Eligibility	Age 65.
Benefit	A normal retiree shall receive a monthly benefit equal to 2.25% of the participant's average monthly compensation per year of credited service. Participants who were participants in certain other prior pension plans will have their benefits reduced by prior plan benefits. Certain participant's may have additional accrual rates apply by special provisions. A minimum benefit of the actuarial equivalent of a participant's contributions accumulated with interest at 5.5% to date of retirement exists for all participants.

Unreduced Early Retirement

Eligibility	Ninety age/service points.
Benefit	An early retiree shall receive a monthly benefit computed in the same manner as a normal retirement benefit but based on the participant's average monthly compensation and credited service at the time of termination. This benefit is unreduced for early commencement.

Early Retirement

Eligibility

Some grandfathered at age 50 with 10 years of service and 70 age/service points. Else, Union 763 is age 50 with 25 years of service, and all others are age 55 with 20 years of service, or age 62 with 10 years of service.

Benefit

An early retiree shall receive a monthly benefit computed in the same manner as a normal retirement benefit but based on the participant's average monthly compensation and credited service at the time of termination. Further, this benefit will be reduced by the lesser of 3% per year from age 62, or 3% per point from 90 age/service points.

Deferred With Vesting

Eligibility

Five years of continuous service.

Benefit

A vested participant who terminates shall be entitled to receive an accrued benefit computed in the same manner as a normal retirement benefit, but based on the participant's average monthly compensation and credited service at the time of termination. Benefits may commence for early retirement. This benefit will be reduced 6% for each year the commencement date precedes age 65.

Preretirement Surviving Spouse Benefit

Eligibility

Five years of continuous service.

Benefit

A spouse who survives a vested participant who has not yet retired shall receive one-half of the benefit to which the participant would have been entitled had the participant retired on the day immediately preceding death. The benefit is reduced by 2% for each year that the surviving spouse is more than five years younger than the participant. The benefit continues during the lifetime of the spouse and begins upon the participant's death.

Preretirement Dependent Survivor Benefit

Eligibility

Actively employed full-time district employees.

Benefit

The percent of base pay at time of death paid as a survivor benefit will be 20% for one dependent, 40% for two dependents, and 50% for three or more dependents. The survivor benefit is offset by amounts payable from the preretirement surviving spouse benefit, workers' compensation survivor payments, and payments from other district-sponsored sources.

Return of Contributions

Eligibility

Plan participants not eligible for vested, death, early or normal retirement benefits. Terminated vested participants have the option to receive this benefit in lieu of their accrued benefit.

Benefit

Participant contributions accumulated with 5.5% interest will be returned.

Normal Form of Benefits

An unmarried participant shall receive a Life Annuity. Married participants will receive an unreduced 50% Joint and Survivor Annuity.

Definitions

Continuous Service	Years of employment with the district during which an employee is compensated for 1,000 or more hours.
Credited Service	One-twelfth of a year of credited service for each calendar month of Service to the district as a full-time employee or as a member by a part-time employee. For union 763 employees attaining 90 points after May 31, 2013, credited service is frozen upon attaining 90 points.
Compensation	Regular wages for services rendered to the District, including base pay, shift differentials and pay for service as an acting crew leader, but excluding any bonuses, pay for overtime and special pay.
Average Monthly Compensation	Average of compensation for the highest 18 consecutive months.
Employee Contributions	6.20%. Rate may be adjusted based on the plan's funded status. For union 763 employees attaining 90 points after May 31, 2013, contributions are stopped upon attaining 90 points.

Cash Balance Formula Provisions

Accrued Benefit

Pay Credits

A participant shall receive annual pay credits equal to a percentage of salary based on points (age plus service) as shown in the table below:

Points	2017	2018	2019	2020	2021	2022
<30	7.0%	8.0%	9.0%	10.0%	10.0%	10.0%
30–39	8.0%	9.0%	10.0%	10.5%	10.5%	10.5%
40–49	9.0%	10.0%	11.0%	11.5%	11.5%	11.5%
50-59	10.0%	10.5%	11.0%	11.5%	11.5%	12.0%
60-69	11.0%	11.5%	12.0%	12.5%	12.5%	12.5%
70-79	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%
80+	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%

Interest Credits

A participant's account will increase annually at an interest crediting rate of 6.00%.

Normal Retirement

Eligibility

Age 65.

Benefit

Lump sum or an actuarial equivalent monthly benefit of their cash balance account.

Early Retirement

Eligibility

Some grandfathered at age 50 with 10 years of service and 70 age/service points. Else, Union 763 is age 50 with 25 years of service, and all others are age 55 with 20 years of service, or age 62 with 10 years of service.

Benefit

Lump sum or an actuarial equivalent monthly benefit of their cash balance account.

Deferred With Vesting

Eligibility	Five years of continuous service.
Benefit	Lump sum or an actuarial equivalent monthly benefit of their cash balance account.

Preretirement Surviving Spouse Benefit

Eligibility	Five years of continuous service.
Benefit	Lump sum or an actuarial equivalent monthly benefit of their cash balance account.

Preretirement Dependent Survivor Benefit

Eligibility	Actively employed full-time district employees.
Benefit	The percent of base pay at time of death paid as a survivor benefit will be 20% for one dependent, 40% for two dependents, and 50% for three or more dependents. The survivor benefit is offset by amounts payable from the preretirement surviving spouse benefit, workers' compensation survivor payments, and payments from other district-sponsored sources.

Return of Contributions

Eligibility	Plan participants not eligible for vested, death, early, or normal retirement benefits.
Benefit	Participant contributions accumulated with 5.5% interest will be returned.

Definitions

Continuous Service	Years of employment with the district during which an employee is compensated for 1,000 or more hours.
Credited Service	One-twelfth of a year of credited service for each calendar month of Service to the district as a full-time employee or as a member by a part-time employee.
Compensation	Regular wages for services rendered to the District, including base pay, shift differentials and pay for service as an acting crew leader, but excluding any bonuses, pay for overtime and special pay.
Employee Contributions	See table below. Rate may be adjusted based on the plans funded status.

Year	Rate
2017	6.2%
2018	6.7%
2019	7.2%
2020	7.7%
2021	8.3%
2022	9.0%

Actuarial Assumptions and Methods

The actuarial assumptions and methods used in the January 1, 2018 valuation are stated below.

| Interest Rate | 7.00% per year compounded annually (net of 0.1% reduction for anticipated administration expenses paid from the trust). |

Salary Scale   Rates based on age.

Age	Annual Rate of Salary Increase
25	13.00%
30	9.50%
35	7.00%
40	5.30%
45	4.80%
50	4.35%
55	4.10%
60	3.00%
64	3.00%

Retirement Rates
Actives   See Table A.
Terminated Vesteds   Age 63.

Healthy Mortality   RP-2014 Aggregate table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2017 with generational projection.

Disabled Mortality   RP-2014 Disabled Retiree table projected back to 2006 using Scale MP-2014 and projected forward using Scale MP-2017 with generational projection.

Withdrawal Rates   Select and ultimate table (see Table B).

Disability Rates   See Table C.

Spousal Benefits   80% of males and 80% of females are assumed to be married. Males are assumed to be two years older than their spouses; females two years younger.

Form of Payment
Final Average Pay Formula   50% Joint and Survivor if married, else Single Life Annuity. 60% of terminated vested participants are assumed to elect the lump sum return of their contributions with interest.
Cash Balance Formula   100% lump sum.

Asset Valuation Method   The prior year asset value is assumed to have earnings equal to the valuation interest rate. The resulting assets are then adjusted by 20% of the difference between this value and the market value. Assets were restated to market value January 1, 1996.

Expenses   Included in net investment return assumption.

Actuarial Method   Entry Age Normal (Level Percent of Pay) Cost Method.

Section 415 Limits   All applicable IRC section 415 limits have been taken into account. The annual benefit payable at Social Security normal retirement age has been limited to $220,000, based on the provisions of IRC section 415(b).

Table A

Retirement Rates[1]

Age	Service								
	19	20	21	22	23	24	25	26	27
50	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
51	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
52	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
53	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
54	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
55	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500
56	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500
57	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000
58	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000	0.10000
59	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500
60	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500	0.12500
61	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000
62	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000
63	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.50000
64	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000	0.15000	0.50000	0.50000
65	0.40000	0.40000	0.40000	0.40000	0.40000	0.40000	0.50000	0.50000	0.50000
66	0.20000	0.20000	0.20000	0.20000	0.20000	0.50000	0.50000	0.50000	0.50000
67	0.40000	0.40000	0.40000	0.40000	0.50000	0.50000	0.50000	0.50000	0.50000
68	0.40000	0.40000	0.40000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
69	0.40000	0.40000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000

Age	Service							
	28	29	30	31	32	33	34	35
50	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
51	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
52	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
53	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
54	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
55	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.50000
56	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.50000	0.50000
57	0.10000	0.10000	0.10000	0.10000	0.10000	0.50000	0.50000	0.30000
58	0.10000	0.10000	0.10000	0.10000	0.50000	0.50000	0.30000	0.30000
59	0.12500	0.12500	0.12500	0.50000	0.50000	0.30000	0.30000	0.30000
60	0.12500	0.12500	0.50000	0.50000	0.30000	0.30000	0.30000	0.30000
61	0.15000	0.50000	0.50000	0.35000	0.35000	0.35000	0.35000	0.35000
62	0.50000	0.50000	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000
63	0.50000	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000
64	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000	0.35000
65	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
66	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
67	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
68	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
69	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000

[1] Rates assume early retirement eligibility requirement is met.

Table B

Withdrawal Rates (prior to Eligibility for Early Retirement)

Age	Total		Age	Total
20	.043500		45	.026500
21	.043000		46	.025750
22	.042500		47	.025000
23	.042000		48	.025000
24	.041500		49	.025000
25	.041000		50	.025000
26	.040500		51	.025000
27	.040000		52	.025000
28	.039250		53	.025000
29	.038500		54	.025000
				.025000
30	.037750		55	.025000
31	.037000		56	.025000
32	.036250		57	.025000
33	.035500		58	.025000
34	.034750		59	.025000
				.025000
35	.034000		60	.025000
36	.033250		61	.025000
37	.032500		62	.025000
38	.031750		63	.025000
39	.031000		64	.025000
40	.030250			
41	.029500			
42	.028750			
43	.028000			
44	.027250			

Select turnover rates shown below are used for the first three years of employment.

	Service		
	1	2	3
All	.0750	.0750	.0750

Table C

Disability Rates

Age	Male	Female		Age	Male	Female
20	.00030	.00030		45	.00160	.00240
21	.00030	.00030		46	.00180	.00270
22	.00030	.00030		47	.00210	.00300
23	.00030	.00030		48	.00250	.00330
24	.00030	.00030		49	.00280	.00360
25	.00030	.00030		50	.00330	.00400
26	.00030	.00030		51	.00390	.00440
27	.00030	.00040		52	.00460	.00490
28	.00030	.00040		53	.00530	.00540
29	.00030	.00040		54	.00610	.00590
30	.00030	.00040		55	.00690	.00640
31	.00030	.00050		56	.00770	.00690
32	.00030	.00050		57	.00860	.00740
33	.00030	.00060		58	.00950	.00800
34	.00030	.00060		59	.01050	.00850
35	.00040	.00070		60	.01150	.00900
36	.00040	.00080		61	.01260	.00960
37	.00050	.00090		62	.01380	.01010
38	.00060	.00100		63	.01510	.01050
39	.00070	.00120		64	.01640	.01090
40	.00080	.00130				
41	.00090	.00150				
42	.00100	.00170				
43	.00120	.00190				
44	.00140	.00220				

Appendix G

Omaha Public School District for Omaha School Employees Retirement (OSERS) Retirement Plan Information

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Dr. Cheryl J. Logan
Superintendent

p 531-299-9822
f 531-299-0415

3215 Cuming Street
Omaha, NE 68131

district.ops.org

Board of Education
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Vice President

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Lou Ann Goding
Shavonna L. Holman
Ben Perlman

Amanda L. Ryan
Matt Scanlan
Ricky Smith

Senator Mark Kolterman
District 24
State Capitol
PO Box 94604
Lincoln, NE 68509-4604

October 15, 2018

Senator Kolterman;

Per your request;

1. **Please list the following is information for OSERS plan years 2013 through current plan year 2018.**

a) The **funded status** information for OSERS is shown below (in millions):

	9/1/2013	9/1/2014	9/1/205	1/1/2017	1/1/2018
Using Actuarial Value of Assets:					
Funded Ratio (AVA/AAL)	73%	74%	73%	65%	64%
Unfunded ALL (ALL-AVA)	$454	$446	$486	$713	$771
Using Market Value of Assets:					
Funded Ratio (MVA/AAL)	70%	75%	67%	56%	58%
Unfunded AAL (AAL - MVA)	$490	$429	$588	$902	$902

b) **Assumed rate of return** for 2018 is 7.5%. The assumed rate of return prior to 2017 was 8%.

c) **Actual Investment Return:**

The money-weighted return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

	Money-Weighted Rate of Return
2014	13.31%
2015	(4.01%)
2016	0.89%
2017	4.16%

d) **Member and employer contribution rates-percentage:**

From 2013 forward, member and employer contribution rates are 9.78% and 9.878% respectively.

e) The **normal cost-percentage rate** from September 1, 2013 through August 31, 2017 is as follows:

<u>Normal Cost Rate</u>

2013	12.05%
2014	12.02%
2015	11.96%
2017	13.07%
2018	13.00%

f) **Actuarially required contribution (ARC)-percentage & dollar amount:**
g) **Actuarially required contribution (ARC)-actual dollars contributed & percentage of ARC actually contributed**

SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER & OTHER CONTRIBUTING ENTITIES
HISTORICAL FUNDING INFORMATION

Year Ending	Annual Required Contribution	Total Employer Contribution	Percentage of ARC Contribution	Actual Contributions as a Percentage of Covered Payroll
8/31/2013	35,032,074	33,623,000	95.98%	10.71%
8/31/2014	34,225,147	38,198,000	111.61%	11.82%
8/31/2015	34,614,093	39,562,000	114.29%	11.87%
8/31/2016	37,665,061	40,564,000	107.70%	11.75%
12/31/2016	12,836,281	13,861,000	107.98%	11.82%
12/31/2017	57,941,493	55,145,000	95.17%	15.39%

2. **Please provide a brief narrative of the circumstances that led to the current underfunding of the retirement plan.**

As of January 1, 2018, the System had total assets of $1.234 billion measured on a market value basis. This was an increase of $85 million from the prior valuation and represents an annualized rate of return of 10.1% net of expenses. There is currently $131 million of deferred (unrecognized) investment loss, about 11% of the market value of assets. Absent favorable investment experience in future years to offset the recognition of this significant deferred loss, it will decrease the System's funded ratio and increase the actuarial contribution rate as it is reflected through the asset smoothing method. If this occurs, the System's funded status is expected to decrease and the contribution shortfall is expected to increase.

The valuation results reflect net unfavorable experience for the 2017 plan year as demonstrated by an unfunded actuarial accrued liability that was higher than expected. The largest source of unfavorable experience ($44 million) resulted from not meeting the expected return of 7.5% on actuarial value of assets.

3. **Have there been any changes in the actuarial methods and/or assumptions since the previous actuarial valuation report? If so, please describe.**

There have been no changes to the System's actuarial assumptions or methods since the prior valuation. Legislation passed in the 2017 session modifies the benefit provisions for members hired on or after July 1, 2018, creating a new tier (referred to as Tier 4). The key change was a change to the minimum age from 55 to 60 for retirement under Rule of 85. As a result, the cost of the Tier 4 benefit structure is lower than the cost of the prior benefit structures. Due to the effective date, there are no Tier 4 members in the current valuation so it had no impact on the valuation results. Over time, as active members covered by the other benefit tiers leave covered employment and are replaced by Tier 4 members, the cost of the System is expected to decrease slightly. However, it will take ten to fifteen years before the impact on the valuation is material.

4. **In what year is the plan's funding ratio expected to reach 100%?**

Depending on investment returns, the plan's funding ratio is expected to reach 100% in 2043.

5. **What is the method used to amortize the unfunded actuarial liability?**

The actuarial contribution rate for the System consists of:

* A "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date.

* An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

The actuarial contribution rate is computed based on the Board of Trustees' funding policy. On that basis, the actuarial contribution rate is equal to the normal cost rate plus the amortization payment on the UAAL. Effective with the January 1, 2017 valuation, OSERS amortizes the UAAL using a "layered" approach. Under this method, the UAAL is split into pieces or layers, the initial or legacy UAAL is amortized as a level-percent of payroll over a closed 30-year period that began with the September 1, 2013 valuation (26 years remain as of the January 1, 2018 valuation). All ensuring UAAL bases, including the actual experience that is different than expected, will be amortized, as a level-percent of payroll over a new 25-year period commencing on the respective valuation date.

6. **Please provide a description of corrective actions implemented to improve the funding status of the plan including, but not limited to, benefit changes, increased contribution rates and/or employer contributions. Please include any actuarial projections based on these changes and attach a copy of the actuarial projections.**

On July 11, 2018, OPS transferred $18.9 million to OSERS to fund the 2018 actuarial required contribution amortized over a 25-year period.

A five-year actuarial required contribution projection from 2019 using the OSERS Board of Trustees' Policy:

2019	$21.3 million
2020	$23.5 million
2021	$25.3 million
2022	$26.9 million
2023	$28.3 million

The above projections are in addition to the statutorily required contributions attributable to the employee/employer (currently 9.78% employee and 101% of employee contribution for the employer). The projected numbers are meant to provide a trend and may not be relied upon as an absolute projection of the actuarially required contributions for future years.

7. **Please describe any recent or ongoing negotiations with bargaining groups that may impact the funding plan.**

Employees of the District are affiliated with several unions. The bargaining unit representing the District's educators in the Omaha Education Association (OEA). The OEA approved a total package increase (salaries plus benefits) of 1.6% for the 2018-19 school year equal to approximately $5 million. The District will begin negotiations for 2019-20 this fall.

Other employees of the District agreed to a 0% salary/benefit increase for 2018-19.

8. **When was the most recent Actuarial Experience Study conducted on the Plan? Please attach a copy of the most recent Actuarial Experience Study.**

The most recent Five-year Experience Study, September 1, 2012 to August 31, 2016 was submitted on April 5, 2017.

Attachment

9. **What is the current assumed rate of return? If the rate has been changed in the past year, or if there are plans to review the rate in the upcoming year, please describe.**

    The current assumed rate of return is 7.5%. We are not aware of any plans to change the assumed rate of return.

10. **Please attach the most recent actuarial valuation report. If the valuation report is completed biannually (or less often) please include an updated report for the interim year/s, if available.**

    Attachment

Sincerely,

Cheryl J. Logan Ed.D., Superintendent
Omaha Public Schools

enclosures: 2018_01.01 OSERS Valuation Report FINAL (05.02.2018)
2017_201-2016 OSERS Experience study report FINAL

Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM

**Sixty-Sixth
Annual Actuarial Report**

OMAHA SCHOOL EMPLOYEES'
RETIREMENT SYSTEM

as of January 1, 2018

Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

May 2, 2018

Board of Trustees
Omaha School Employees' Retirement System
3215 Cuming Street
Omaha, Nebraska 68131

Re: Sixty-Sixth Annual Actuarial Report

Members of the Board:

At your request, we have performed an actuarial valuation of the Omaha School Employees' Retirement System (OSERS) as of January 1, 2018. The major findings of the valuation are contained in this report, including the actuarial contribution rate and the additional School District contribution for the year ending December 31, 2018. There have been no changes to the System's actuarial assumptions or methods since the prior valuation. Legislation passed in the 2017 session modifies the benefit provisions for members hired on or after July 1, 2018, creating a new tier. Since there are no members in the current valuation who are subject to the new provisions, the change had no impact on the valuation results in this report.

In preparing this report, we relied, without audit, on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, member data and financial information. While we found this information to be reasonably consistent and comparable with information used for other purposes, we did not audit the data. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

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 System's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

The actuarial computations presented in this report are for purposes of determining the actuarial contribution amount for the System, as set out in the Nebraska State Statutes. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. For example, actuarial computations for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards No. 67 and No. 68 are presented in separate reports.

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald Consulting's advice is not intended to be a substitute for qualified legal or accounting counsel.

This is to certify that the independent consulting actuaries have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System. We, Patrice A. Beckham, FSA and Bryan K. Hoge, FSA, are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. We are available to answer any questions on the material contained in this report or to provide explanations or further details as may be appropriate.

We herewith submit the following report and look forward to discussing it with you.

Respectfully Submitted,

Cavanaugh Macdonald Consulting, LLC

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Bryan K. Hoge, FSA, EA, FCA, MAAA
Senior Actuary

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The primary purposes of performing the actuarial valuation are as follows:

- to calculate the actuarial contribution rate necessary to maintain the solvency of the System, as set out in the Board of Trustees' Funding Policy,
- to determine the additional contribution amount, if any, from the School District given the fixed statutory contribution rates for members, the School District (101% of members' contributions), and the State of Nebraska;
- to evaluate the funded status of the System and disclose various asset and liability measures as of the valuation date;
- to determine the experience of the System since the last valuation; and
- to analyze and report on trends in System contributions, assets, and liabilities over the past several years.

This report presents the results of the January 1, 2018 actuarial valuation of the Omaha School Employees' Retirement System (OSERS). The actuarial valuation results provide a "snapshot" view of the System's financial condition on January 1, 2018 based on the System's membership, benefit structure, and assets on that date. The valuation results reflect net unfavorable experience for the 2017 plan year as demonstrated by an unfunded actuarial accrued liability that was higher than expected, based on the results of the prior valuation. The largest source of unfavorable experience ($44 million) resulted from not meeting the expected return of 7.50% on the actuarial value of assets.

Membership

The table on the following page summarizes the System's membership, by group, in the current and prior valuation. Over the last year, there has been a 2.4% increase in the System's total membership. The active member count increased from 7,462 to 7,569 (1.4%) and the number of members receiving a benefit increased from 4,542 to 4,678 (3.0%). Total projected payroll increased 4.2% from $335.8 million in the January 1, 2017 valuation to $349.9 million in the current valuation.

The 2017 session of the Nebraska Legislature created a new benefit structure for members hired on or after July 1, 2018 (referred to as Tier 4). The key change was a change to the minimum age from age 55 to 60 for retirement under Rule of 85. As a result, the cost of the Tier 4 benefit structure is lower than the cost of the prior benefit structures. Due to the effective date, there are no Tier 4 members in the current valuation so it had no impact on the valuation results in this report. Over time, as active members covered by the other benefit tiers leave covered employment and are replaced by Tier 4 members the cost of the System is expected to decrease slightly. However, it will take ten to fifteen years before the impact on the valuation is material.

SYSTEM MEMBERSHIP	Jan. 1, 2018	Jan. 1, 2017	% Chg
1. Active Members			
a. Certificated			
(1) Tier 1	3,247	3,469	(6.4)
(2) Tier 2	988	1,023	(3.4)
(3) Tier 3	637	316	101.6
(4) Total	**4,872**	**4,808**	**1.3**
b. Classified			
(1) Tier 1	1,589	1,751	(9.3)
(2) Tier 2	701	736	(4.8)
(3) Tier 3	407	167	143.7
(4) Total	**2,697**	**2,654**	**1.6**
c. Total			
(1) Tier 1	4,836	5,220	(7.4)
(2) Tier 2	1,689	1,759	(4.0)
(3) Tier 3	1,044	483	116.1
(4) Total	**7,569**	**7,462**	**1.4**
2. Retirees and Disabled Members	4,426	4,295	3.1
3. Beneficiaries	252	247	2.0
4. Inactive Vested Members	1,043	1,035	0.8
5. Nonvested Terminations	413	347	19.0
6. Total	13,703	13,386	2.4

Assets

As of January 1, 2018, the System had total assets of $1.234 billion measured on a market value basis. This was an increase of $85 million from the prior valuation and represents an annualized rate of return of 10.1%, net of all expenses. The components of this change are shown in the following table:

	Market Value ($M)
Net Assets, January 1, 2017	$ 1,149
• District, State and Member Contributions	+ 92
• Benefit Payments and Refunds	− 121
• Administrative Expenses	− 2
• Investment Return	+ 116
Net Assets, January 1, 2018	$ 1,234

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability (UAAL) and actuarial contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation. This amount, called the "actuarial value of assets", is equal to the expected asset value, based on the actuarial value in the prior valuation and the assumed investment return in the prior valuation of 7.5%, plus 25% of the difference between the actual market value and the expected asset value. The resulting value must be no less than 80% of market value and no more than 120% of market value (referred to as a "corridor"). The corridor did not apply this year as the actuarial value of assets was 111% of market value. The actuarial value of assets as of January 1, 2018 was $1.365 billion, an increase of $27 million from the prior year. The components of change in the actuarial value of assets from January 1, 2017 to January 1, 2018 are shown in the following table.

	Actuarial Value ($M)
Actuarial Assets, January 1, 2017	$ 1,338
• District, State and Member Contributions	+ 92
• Benefit Payments and Refunds	− 121
• Expected Investment Income (based on 7.5% assumption)	+ 100
• Actuarial Investment Gain/(Loss)	− 44
Preliminary Actuarial Assets, January 1, 2018	$ 1,365
• Application of Corridor	N/A
Final Actuarial Assets, January 1, 2018	$ 1,365

The dollar-weighted annualized rate of return, net of investment and administrative expenses, measured on the actuarial value of assets was approximately 4.2%. A comparison of asset values on both the market and actuarial basis is shown below:

	9/1/2012	9/1/2013	9/1/2014	9/1/2015	1/1/2017	1/1/2018
Market Value of Assets	$ 1,096	$ 1,170	$ 1,295	$ 1,211	$ 1,149	$ 1,234
Actuarial Value of Assets	1,155	1,205	1,278	1,313	1,338	1,365
Actuarial Value/Market Value	105%	103%	99%	108%	116%	111%

The actuarial value of assets continues to be higher than the market value of assets. However, the different has declined and now the deferred or unrecognized investment loss is $131 million, about 11% of the market value of assets. Absent favorable investment experience in future years to offset the recognition of this significant deferred loss, it will decrease the System's funded ratio and increase the actuarial contribution rate as it is reflected through the asset smoothing method. The recognition of the deferred investment loss in future years is expected to cause the amount of any additional School District contributions to increase as well.

System Net Assets
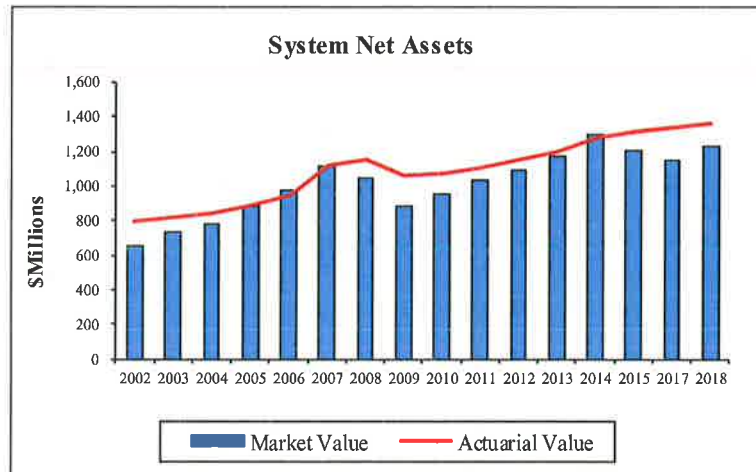
With the use of an asset smoothing method, the actuarial value is expected to be both above and below the market value of assets over a long period of time. However, for most of this period, the actuarial value of assets has exceeded the market value of assets.
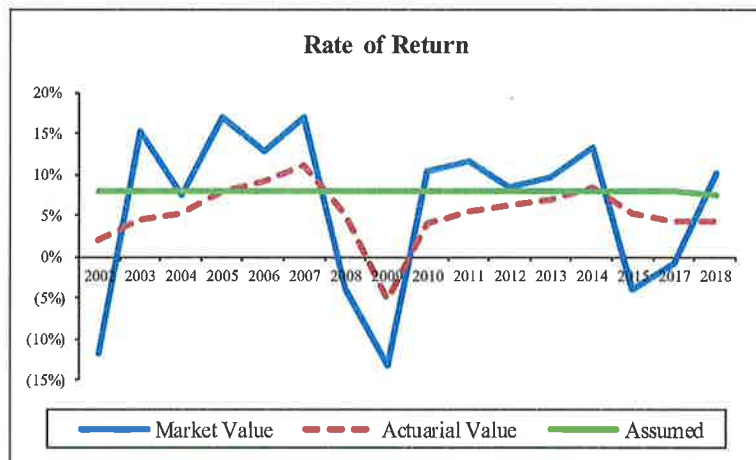
Rate of Return

The estimated rate of return on both the actuarial and market value of assets for the last decade is shown in this graph. The asset smoothing method mitigates the volatility of market value returns as shown in the rates of return on the actuarial versus market value of assets.

Liabilities

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and asset values at the same date is referred to as the unfunded actuarial accrued liability (UAAL). The unfunded actuarial accrued liability will be reduced if the employer's contributions exceed the employer's normal cost for the year, after allowing for interest earned on the previous balance of the unfunded actuarial accrued liability. Benefit improvements, experience gains and losses, and changes in actuarial assumptions and methods will also impact the total actuarial accrued liability (AAL) and the unfunded portion thereof.

The unfunded actuarial accrued liability as of January 1, 2018 is shown below:

Actuarial Accrued Liability	$	2,136,385,000
Actuarial Value of Assets		1,365,013,000
Unfunded Actuarial Accrued Liability	$	771,372,000

Numerous factors contributed to the change in the System's UAAL during the 2017 plan year. The components are examined in the following discussion.

Actuarial gains (or losses) result from actual experience that is more (or less) favorable than anticipated based on the actuarial assumptions. These "experience" (or actuarial) gains or losses are reflected in the UAAL and are measured as the difference between the expected unfunded actuarial accrued liability and the actual unfunded actuarial accrued liability, taking into account any changes due to assumption, method or benefit provision changes. Overall, the System experienced an actuarial loss of $56 million. Investment experience on the actuarial value of assets during the 2017 plan year created an actuarial loss of $44 million. There was also an actuarial loss of $12 million on the actuarial accrued liability, largely due to retirement experience and actual salary increases that were higher than expected.

The change in the unfunded actuarial accrued liability between January 1, 2017 and January 1, 2018 is shown in the following table (in millions):

Unfunded Actuarial Accrued Liability, January 1, 2017	$	713
• Expected change in UAAL		
– Amortization method	+	7
– Contributions less than the actuarial required contribution	+	3
• Investment experience	+	44
• Liability experience	+	12
• Other experience	–	8
Unfunded Actuarial Accrued Liability, January 1, 2018	$	771

An evaluation of the unfunded actuarial accrued liability on a pure-dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both large numbers) is reflected. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial accrued liability. Note that the funded ratio does not necessarily indicate whether or not additional funding is needed, nor does it indicate whether or not the plan has sufficient funds to settle all current obligations.

The funded status information for OSERS is shown below (in millions):

	9/1/12	9/1/13	9/1/14	9/1/15	1/1/17	1/1/18
Using Actuarial Value of Assets:						
Funded Ratio (AVA/AAL)	73%	73%	74%	73%	65%	64%
Unfunded AAL (AAL - AVA)	$435	$454	$446	$486	$713	$771
Using Market Value of Assets:						
Funded Ratio (MVA/AAL)	69%	70%	75%	67%	56%	58%
Unfunded AAL (AAL - MVA)	$497	$490	$429	$588	$902	$902
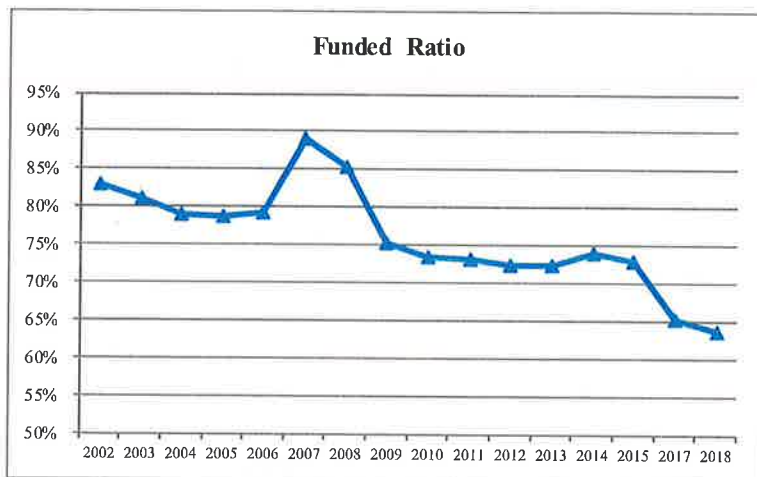
Funded Ratio

Changes in actuarial assumptions and methods, coupled with investment returns below the assumed rate and contributions below the actuarial rate significantly reduced the funded ratio over much of this period. However, with the adoption of the Board's current funding policy, the funded ratio is expected to increase steadily in the future assuming assumptions are met and the full actuarial contribution amounts are made.

Contributions

The actuarial contribution rate for the System consists of:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date,
- an "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

The actuarial contribution rate is computed based on the Board of Trustees' funding policy. On that basis, the actuarial contribution rate (item 3 below) is equal to the normal cost rate plus the amortization payment on the UAAL. Effective with the January 1, 2017 valuation, OSERS amortizes the UAAL using a "layered" approach. Under this method, the UAAL is split into pieces or layers; the initial or legacy UAAL is amortized, as a level-percent of payroll, over a closed 30-year period that began with the September 1, 2013 valuation (26 years remain as of the January 1, 2018 valuation). All ensuing UAAL bases, including the increase in the UAAL due to the assumption changes in the 2017 valuation and changes in the UAAL due to actual experience that is different than expected, will be amortized, as a level-percent of payroll, over a new 25-year period commencing on the respective valuation date.

The actuarial contribution rate for the plan year ending December 31, 2018, and any resulting additional School District contribution, is computed based on the January 1, 2018 actuarial valuation. The ongoing, fixed contributions to the System are set by state statute and are shown below in item 4, "Statutory Contribution Rate". They include the member contribution rate of 9.78%, the State contribution rate of 2%, and the School District contribution rate which is 101% of the member contribution rate.

As a result, there is a contribution shortfall for the 2018 plan year of 5.39%, as shown in the table below:

| | Actuarial Valuation | |
Contribution Rate	1/1/2018	1/1/2017
1. Normal Cost	13.00%	13.07%
2. UAAL Contribution	14.05%	13.22%
3. Total Actuarial Contribution Rate	27.05%	26.29%
4. Statutory Contribution Rate	21.66%	21.66%
5. Contribution Shortfall/(Margin) (3) – (4)	5.39%	4.63%
6. Additional District Contribution ($M)	$18.9	$15.5

The unfavorable experience on the actuarial value of assets during 2017 was the most significant contributing factor to the change in the System's actuarial contribution rate since the prior valuation. Despite a strong return on the market value of assets (around 10%), the return on the actuarial value of assets was only 4% due to the significant deferred investment losses that existed in the 2017 valuation. As a result of this unfavorable experience, the actuarial contribution rate increased by 0.81% of covered payroll. Overall, there was an increase of 0.76% in the actuarial contribution rate from 26.29% in the January 1, 2017 to 27.05% in the January 1, 2018 valuation.

The difference in the actuarial contribution rate and the statutory contribution rate results in a contribution shortfall for 2018 of 5.39% of covered payroll, or $18.9 million. Also, even with the favorable investment experience for the 2017 plan year, a $131 million deferred investment loss still exists (market value is lower than actuarial value of assets). Absent favorable investment experience in future years to offset the recognition of the deferred loss, the actuarial contribution rate is expected to increase as the deferred investment loss is reflected through the asset smoothing method. If this occurs, the System's funded status is expected to decrease and the contribution shortfall is expected to increase, possibly significantly (see the table on page 8 for an indication of the magnitude).

Comments

The January 1, 2018 actuarial valuation reflects a decline in the System's funded ratio and a corresponding increase in the actuarial contribution rate and the amount of additional contributions required by the School District. The System's unfunded actuarial accrued liability increased from $713 million in the January 1, 2017 valuation to $771 million in the current valuation. The funded ratio decreased from 65% in the prior valuation to 64% in the January 1, 2018 valuation. Unfavorable experience during the 2017 plan year occurred on both the System's assets and liabilities. As a result of the unfavorable experience, the actuarial contribution rate increased by 1.03% of covered payroll.

The Nebraska statutes provide that the School District shall contribute the greater of (a) one hundred and one percent of the contributions made by the employees or (b) such amount as may be necessary to maintain the solvency of the System, as determined annually by the Board upon recommendation of the Actuary and the Trustees. The Trustees have adopted a Funding Policy that sets the criteria for determining the contribution amount necessary to maintain the solvency of the System. On this basis, the Actuarial Contribution Rate for the plan year ending December 31, 2018 is 27.05% of payroll. The total of contributions made by members, the State, and the School District for plan year ending December 31, 2018 is 21.66% of payroll, so the actuarial contribution rate exceeds the statutory contribution rates by

5.39%. This contribution shortfall of $18.9 million represents the additional required contribution by the School District needed for the 2018 plan year.

The deferred investment loss (actuarial value less market value of assets) is $131 million as of January 1, 2018, down from $189 million as of January 1, 2017. Absent favorable investment experience in future years, the deferred investment loss of $131 million will eventually be reflected in the actuarial value of assets in future years. While the use of an asset smoothing method is a common method used by public retirement systems, it is important to identify the potential impact of the deferred investment experience. This is accomplished by comparing the key valuation results from the January 1, 2018 actuarial valuation using both the actuarial and market value of assets (see table below).

	Using Actuarial Value of Assets	Using Market Value of Assets
Actuarial Accrued Liability	$2,136,385,000	$2,136,385,000
Asset Value	1,365,013,000	1,234,040,000
Unfunded Actuarial Accrued Liability	$ 771,372,000	$ 902,345,000
Funded Ratio	63.89%	57.76%
Normal Cost Rate	13.00%	13.00%
UAAL Contribution Rate	14.05%	16.46%
Actuarial Contribution Rate	27.05%	29.46%
Total Statutory Contribution Rate	(21.66%)	(21.66%)
Contribution Shortfall	5.39%	7.80%

We conclude this executive summary by presenting comparative statistics and actuarial information from both the January 1, 2017 and January 1, 2018 valuations.

	Jan. 1, 2018	Jan. 1, 2017	% Chg
SYSTEM MEMBERSHIP			
1. Active Membership			
- Number of Members	7,569	7,462	1.4
- Projected Payroll for Upcoming Fiscal Year	$349.9M	$335.8M	4.2
- Average Salary	46,233	44,998	2.7
2. Inactive Membership			
- Number Not in Pay Status	1,456	1,382	5.4
- Number of Retirees/Beneficiaries	4,678	4,542	3.0
- Total Annual Benefits in Pay	$120.9M	$116.0M	4.2
ASSETS AND LIABILITIES			
1. Net Assets			
- Market Value	$1,234M	$1,149M	7.4
- Actuarial Value	1,365M	1,338M	2.0
2. Projected Liabilities			
- Retired Members	$1,275M	$1,231M	3.6
- Inactive Members	37M	36M	2.8
- Active Members	1,221M	1,168M	4.5
- Total Liability	2,533M	2,434M	4.1
3. Actuarial Accrued Liability (AAL)	$2,136M	$2,051M	4.1
4. Unfunded Actuarial Accrued Liability	$771M	$713M	8.1
5. Funded Ratio			
a. Actuarial Value Assets/AAL	63.89%	65.25%	(2.1)
b. Market Value Assets/AAL	57.76%	56.01%	3.1
SYSTEM CONTRIBUTIONS			
1. Total Actuarial Contribution Rate	27.05%	26.29%	2.9
2. Statutory Contribution Rate			
a. Member Contribution Rate	9.78%	9.78%	0.0
b. Employer Contribution Rate	9.88%	9.88%	0.0
c. State Contribution Rate	2.00%	2.00%	0.0
d. Total	21.66%	21.66%	0.0
3. Contribution Shortfall/(Margin) (1.) - (2.d.)	5.39%	4.63%	16.4
4. Additional District Contribution	$18,861,681	$15,546,493	21.3

M = ($)Millions
Note: Numbers may not add due to rounding

HISTORICAL CHANGES IN THE OSERS UNFUNDED ACTUARIAL ACCRUED LIABILITY

(dollars in millions)

							Valuation Date									
	9/1/03	9/1/04	9/1/05	9/1/06	9/1/07	9/1/08	9/1/09	9/1/10	9/1/11	9/1/12	9/1/13	9/1/14	9/1/15	1/1/17	1/1/18	Total
Prior Valuation UAAL	163	191	223	240	246	138	198	349	390	406	437	455	446	486	713	713
Amortization Method	4	5	6	7	5	3	4	6	2	8	9	10	9	12	7	97
Actual Contributions																
Less than ARC	0	0	2	0	3	0	0	2	4	0	2	0	0	0	3	16
More than ARC	0	0	0	(2)	0	(7)	(2)	0	0	(4)	0	(4)	(5)	(4)	0	(28)
Actual vs Expected Experience																
Investment	27	23	1	(10)	(29)	33	151	42	26	20	12	(6)	34	63	44	431
Salary	(5)	(6)	(1)	4	1	1	0	(13)	(15)	(12)	(6)	(8)	(3)	*	3	(60)
Retirement	3	0	3	2	2	3	(2)	(4)	(1)	4	4	6	9	*	7	36
Mortality	2	5	4	3	3	1	(2)	0	(2)	2	(2)	(1)	2	*	(1)	14
Termination of Employment	(4)	(1)	2	3	1	7	2	3	2	0	1	(1)	(2)	*	(1)	12
Other	1	3	0	(1)	(3)	(1)	0	0	0	13	(8)	(5)	(4)	(6)	(4)	(15)
Benefit Changes	0	0	0	0	(3)[2]	0	0	0	0	0	(4)	0	0	0	0	(7)
Assumption Changes	0	0	0	0	0	20	0	0	0	0	10	0	0	138	0	168
Change to Actuarial Methods	0	3[1]	0	0	(88)[3]	0	0	5	0	0	0	0	0	0	0	(80)
Total Change for Year End	28	32	17	6	(108)	60	151	41	16	31	18	(9)	40	227*	58	
UAAL on Valuation Date	191	223	240	246	138	198	349	390	406	437	455	446	486	713	771	

[1] Included part-time members who are vested
[2] Increase in member contribution rate
[3] Actuarial asset value reset to market value
* Not calculated. Total liability experience was a $24 million loss, which is included in the total change at year end.

Note: Although a total column is shown, the amounts in each year are not additive because they are calculated on each valuation date and, therefore, represent a value at a different point in time.

EXHIBIT 1 – SUMMARY OF FUND ACTIVITY (MARKET VALUE OF ASSETS)

SUMMARY OF FUND ACTIVITY
(Market Value Basis)

For Period Ended December 31, 2017

NET ASSETS ON JANUARY 1, 2017	$	**1,148,582,000**

ADDITIONS

Salary deductions	$	35,145,000
School District contributions		48,248,000
Purchases of service		457,000
State service annuity receipts		1,650,000
Sec. 79-916 deposits		6,897,000
Income from investments, including realized and unrealized gains		116,393,000
Total additions	$	**208,790,000**

DEDUCTIONS

Retirement benefits	$	(115,469,000)
Refunds to employees		(5,536,000)
Professional fees		(1,758,000)
Other		(80,000)
Personnel costs		(489,000)
Total deductions	$	**(123,332,000)**

NET ASSETS ON JANUARY 1, 2018	$	**1,234,040,000**

Note: The asset balance as of January 1, 2018 was calculated on a Cash Basis. In prior valuations, the market value of assets was calculated on an Accrual Basis.

EXHIBIT 2 – ACTUARIAL VALUE OF NET ASSETS

ACTUARIAL VALUE OF NET ASSETS

As of January 1, 2018

1.	Actuarial Value of Assets as of January 1, 2017	$ 1,337,983,000
2.	Actual Contributions/Disbursements	
	a. Contributions	92,397,000
	b. Benefit payments	(121,005,000)
	c. Net change	(28,608,000)
3.	Expected Value of Assets as of January 1, 2018 $[(1) \times 1.075] + [(2c) \times (1.075)^{1/2}]$	1,408,670,000
4.	Market Value of Assets as of January 1, 2018	1,234,040,000
5.	Difference between Market and Expected Values $(4) - (3)$	(174,630,000)
6.	Initial Actuarial Value of Assets as of January 1, 2018 $(3) + [(5) \times 25\%]$	1,365,013,000
7.	Corridor as of January 1, 2018	
	a. 120% of Market Value of Assets as of January 1, 2018	1,480,848,000
	b. 80% of Market Value of Assets as of January 1, 2018	987,232,000
8.	Final Actuarial Value of Assets as of January 1, 2018* (6), but not greater than (7a), nor less than (7b)	1,365,013,000
9.	Actuarial value divided by market value $(8) / (4)$	110.6%
10.	Market value less actuarial value	$ (130,973,000)

The estimated annualized rate of return on the actuarial value of assets for the period ended December 31, 2017 is about 4.2%

EXHIBIT 3 – ACTUARIAL BALANCE SHEET

ACTUARIAL BALANCE SHEET

As of January 1, 2018

ASSETS

Actuarial Value of Assets	$	1,365,013,000
Present Value of Contributions for Unfunded Actuarial Accrued Liability		771,372,000
Present Value of Future Normal Costs		397,004,000
Total Assets	$	**2,533,389,000**

LIABILITIES

Present Value of Future Benefits			
Retirees, Beneficiaries, and Disableds		$	1,274,528,000
Inactive Vesteds			35,152,000
Nonvested Terminations			2,269,000
Active Members			
Retirement benefits	$ 1,153,186,000		
Termination benefits	58,268,000		
Death benefits	9,986,000		
			1,221,440,000
Total Liabilities		$	**2,533,389,000**

EXHIBIT 4 – UNFUNDED ACTUARIAL ACCRUED LIABILITY

UNFUNDED ACTUARIAL ACCRUED LIABILITY

As of January 1, 2018

1.	Present Value of Future Benefits	$ 2,533,389,000
2.	Present Value of Future Normal Costs	397,004,000
3.	Actuarial Accrued Liability (1) – (2)	2,136,385,000
4.	Actuarial Value of Assets	$ 1,365,013,000
5.	Unfunded Actuarial Accrued Liability (3) – (4)	771,372,000

AMORTIZATION OF THE
UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)

Amortization Bases	Original Amount	1/1/2018 Remaining Payments	Date of Last Payment	Outstanding Balance as of 1/1/2018	Annual Contribution*
2017 UAAL Base	$ 574,871,000	26	1/1/2043	$ 581,162,615	$ 36,670,208
2017 Assumption Changes	137,727,000	24	1/1/2041	138,841,660	9,176,452
2018 Experience Base	51,367,725	25	1/1/2042	51,367,725	3,314,790
Total				$ 771,372,000	$ 49,161,450

* Contribution amount reflects mid-year timing.

1. Total UAAL Amortization Payments	$	49,161,450
2. Projected Payroll for plan year ending December 31, 2018	$	349,938,417
3. UAAL Amortization Payment Rate		14.05%

EXHIBIT 6 – ANALYSIS OF CONTRIBUTION RATE

ANALYSIS OF CONTRIBUTION RATE

The System is financed by contributions from the members, the School District and the State. Effective September 1, 2013, the members contribute 9.78% of pay. The District is obligated to pay the greater of (a) one hundred and one percent of the member contributions or (b) such amount as may be necessary to maintain the solvency of the System. Under the funding policy adopted by the Board in May 2013, the Actuarial Recommended Contribution rate (ARC) is the normal cost rate plus the contribution necessary to amortize the UAAL. Effective July 1, 2014, the State of Nebraska contributes 2.0% of pay.

1. Normal Cost	$ 41,702,834
2. a. Expected Payroll for Current Actives for Year End December 31, 2018	320,827,284
b. Total Expected Payroll for Year End December 31, 2018	349,938,417
3. Normal Cost Rate (1)/(2a)	13.00%
4. Unfunded Actuarial Accrued Liability at Valuation Date	771,372,000
5. UAAL Contribution at Mid-Year	49,161,450
6. UAAL Contribution Rate (5)/(2b)	14.05%
7. Actuarial Recommended Contribution Rate (3) + (6)	27.05%
8. Statutory Contribution Rate:	
(a) Member	9.78%
(b) District	9.88%
(c) State	2.00%
(d) Total	21.66%
9. Contribution Shortfall (7) - (8d)	5.39%
10. Additional District Contribution (9) * (2b)	$ 18,861,681

EXHIBIT 7 – CALCULATION OF ACTUARIAL GAIN/(LOSS)

CALCULATION OF ACTUARIAL GAIN/(LOSS)

The overall actuarial gain/(loss) is comprised of both a liability gain/(loss) and an actuarial asset gain/(loss). Each of these represents the difference between the expected and actual values as of January 1, 2018.

1.	Expected Actuarial Accrued Liability	
	a. Actuarial Accrued Liability as of January 1, 2017	$ 2,050,581,000
	b. Normal cost for plan year ending December 31, 2017	40,205,000
	c. Benefit payments for plan year ending December 31, 2017	(121,005,000)
	d. Additional liability for state service annuities and service purchases	2,107,000
	e. Interest on a., b., c., and d. to end of year	152,431,000
	f. Expected Actuarial Accrued Liability	$ 2,124,319,000
2.	Actuarial Accrued Liability as of January 1, 2018	$ 2,136,385,000
3.	Liability Gain/(Loss) (1.f.) – (2)	$ (12,066,000)
4.	Liability Gain/(Loss) as a Percent of Actuarial Accrued Liability	(0.56%)
5.	Expected Actuarial Value of Assets	
	a. Actuarial value of assets as of January 1, 2017	$ 1,337,983,000
	b. Contributions for plan year ending December 31, 2017 (including state service annuities and service purchases)	92,397,000
	c. Benefit payments for plan year ending December 31, 2017	(121,005,000)
	d. Interest on a., b., and c. to end of year	99,295,000
	e. Expected actuarial value of assets	$ 1,408,670,000
6.	Actuarial Value of Assets as of January 1, 2018	$ 1,365,013,000
7.	Asset Gain/(Loss) (6) – (5.e.)	$ (43,657,000)
8.	Asset Gain/(Loss) as a Percent of Actuarial Value of Assets	(3.20%)
9.	Overall Actuarial Gain/(Loss) (3) + (7)	$ (55,723,000)

EXHIBIT 7 – CALCULATION OF ACTUARIAL GAIN/(LOSS)

Gain/(Loss) By Source

The System experienced a net actuarial loss on liabilities of about $12.1 million during the plan year ended December 31, 2017. The major components of this overall loss are shown below:

Liability Sources	$Millions
Salary Increases	$ (2.9)
Mortality	1.4
Terminations	1.2
Retirements	(7.4)
Disability	(0.1)
New Entrants/Rehires	(4.5)
Miscellaneous	0.2
Total Liability Gain/(Loss)	**$ (12.1)**
Asset Gain/(Loss)	**$ (43.7)**
Net Actuarial Gain/(Loss)	**$ (55.8)**

Comments

The purpose of conducting an actuarial valuation of a retirement system is to determine the costs and liabilities for the benefits under the system, to determine the annual level of contribution required to support these benefits and, finally, to analyze the system's overall experience as it compares with the actuarial assumptions used in the valuation. The costs and liabilities of a retirement system reported in the valuation depend not only upon the level of benefits provided, but also upon factors such as investment return on invested funds, mortality rates for active and retired members, withdrawal rates among active members, rates at which salaries increase, and rates of retirement for ages at which members retire. The actuarial assumptions employed as to these and other contingencies in the current valuation are set forth in Appendix C of this report.

Net demographic actuarial experience for the year was a loss of $12.1 million, about 0.6% of actuarial accrued liability. The largest sources of unfavorable experience were a $7.4 million loss from retirement experience, a $4.5 million loss due to new entrants and rehires, and a $2.9 million loss due to higher salary increases than expected.

Another significant component of the experience for the year ending December 31, 2017 was the investment experience. Despite favorable asset experience on a market value basis, deferred asset losses from prior years resulted in a loss on the actuarial value of assets of $43.7 million. As of January 1, 2018, there is a deferred investment loss of $131 million. Absent favorable investment experience, the deferred loss will flow through the valuation over the next few years and increase both the UAAL and the actuarial contribution rate.

EXHIBIT 8 – SCHEDULE OF CONTRIBUTIONS

SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER
AND OTHER CONTRIBUTING ENTITIES

HISTORICAL FUNDING INFORMATION

Year Ending	Annual Required Contribution (a)	Total Employer Contribution* (b)	Percentage of ARC Contribution (b) / (a)
8/31/2005	$22,459,221	$20,210,403	89.99%
8/31/2006	24,311,628	26,766,000	110.10%
8/31/2007	28,143,388	24,981,000	88.76%
8/31/2008	19,491,557	26,162,000	134.22%
8/31/2009	24,103,114	25,918,000	107.53%
8/31/2010	30,900,224	29,182,000	94.44%
8/31/2011	34,180,566	30,255,000	88.52%
8/31/2012	32,957,547	37,109,000	112.60%
8/31/2013	35,032,074	33,623,000	95.98%
8/31/2014	34,225,147	38,198,000	111.61%
8/31/2015	34,614,093	39,562,000	114.29%
8/31/2016	37,665,061	40,564,000	107.70%
12/31/2016**	12,836,281	13,861,000	107.98%
12/31/2017	57,941,493	55,145,000	95.17%

* Includes State and School District contributions.

** For the short Plan Year from September 1, 2016 through December 31, 2016.

Note: The Total Employer Contribution for fiscal year ending 8/31/2014 was changed because during our work on the GASB reports, we discovered the Service Annuity contribution was different from what was initially reported to us. This figure now matches the number found in the GASB reports.

EXHIBIT 9 – SCHEDULE OF FUNDING PROGRESS

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b – a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b – a)/c]
9/1/2005	$ 887,165,000	$ 1,126,967,000	$ 239,802,000	78.72%	$ 231,708,783	103.49%
9/1/2006	948,938,000	1,195,354,000	246,416,000	79.39%	248,759,070	99.06%
9/1/2007	1,117,628,000 *	1,255,527,000	137,899,000	89.02%	272,844,149	50.54%
9/1/2008	1,149,289,000	1,346,999,000	197,710,000	85.32%	272,720,007	72.50%
9/1/2009	1,061,326,000	1,410,318,000	348,992,000	75.25%	287,770,291	121.27%
9/1/2010	1,078,269,000	1,467,850,000	389,581,000	73.46%	302,229,282	128.90%
9/1/2011	1,110,033,000	1,516,284,000	406,251,000	73.21%	310,228,916	130.95%
9/1/2012	1,155,495,000	1,592,738,000	437,243,000	72.55%	307,258,065	142.30%
9/1/2013	1,205,265,000	1,660,287,000	455,022,000	72.59%	313,946,237	144.94%
9/1/2014	1,277,546,000	1,723,970,000	446,424,000	74.10%	323,077,710	138.18%
9/1/2015	1,312,905,000	1,798,706,000	485,801,000	72.99%	333,166,135	145.81%
1/1/2017	1,337,983,000	2,050,581,000	712,598,000	65.25%	351,940,122 **	202.48%
1/1/2018	1,365,013,000	2,136,385,000	771,372,000	63.89%	359,359,507	214.65%

* The actuarial value of assets was reset to market value as of 9/1/2007.
** Covered Payroll was annualized for the short Plan Year in 2016.

EXHIBIT 10 – SOLVENCY TEST

SOLVENCY TEST

A short-term solvency test, which is one method of determining a system's progress under its funding program, compares the plan's present assets with: 1) the liability for active member contributions on deposit; 2) the liability for future benefits to present retirees; and (3) the liability for service already rendered by active members. In a system that has been following the level-percent of payroll financing discipline, the obligation for active member contributions on deposit (Item 1) and the liabilities for future benefits to present retired lives (Item 2) will be fully covered by present assets with the exception of rare circumstances. The obligation for service already rendered by active members (Item 3) will be partially covered by the remainder of present assets. Absent any significant benefit changes, if the system has been using level cost financing, the funded portion of Item 3 usually will increase over a period of time.

Actuarial Valuation*	Active Member Contributions (1)	Retirees, Beneficiaries, and Inactives (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Liabilities Covered by Assets		
					(1)	(2)	(3)
2012	$249,903,000	$955,399,000	$387,436,000	$1,155,495,000	100%	95%	0%
2013	272,347,000	1,001,953,000	385,987,000	1,205,265,000	100%	93%	0%
2014	281,672,000	1,058,156,000	384,142,000	1,277,546,000	100%	94%	0%
2015	292,731,000	1,129,399,000	376,576,000	1,312,905,000	100%	90%	0%
2017	306,276,000	1,266,557,000	477,748,000	1,337,983,000	100%	81%	0%
2018	316,337,000	1,311,949,000	508,099,000	1,365,013,000	100%	80%	0%

* The actuarial valuation date for years prior to 2017 was September 1.

EXHIBIT 11 – ESTIMATED BENEFIT PAYMENTS

ESTIMATED BENEFIT PAYMENTS*

Year End	Currently In-Pay	Currently Not-In-Pay	Total
2018	$118,114,000	$ 7,293,000	$125,407,000
2019	118,075,000	12,000,000	130,075,000
2020	117,822,000	16,616,000	134,438,000
2021	117,375,000	21,384,000	138,759,000
2022	116,656,000	26,436,000	143,092,000
2023	115,840,000	31,620,000	147,460,000
2024	114,997,000	37,280,000	152,277,000
2025	114,072,000	43,219,000	157,291,000
2026	112,927,000	49,806,000	162,733,000
2027	111,545,000	56,667,000	168,212,000
2028	109,917,000	63,816,000	173,733,000
2029	107,939,000	71,538,000	179,477,000
2030	105,744,000	79,793,000	185,537,000
2031	103,345,000	88,245,000	191,590,000
2032	100,743,000	97,224,000	197,967,000

*Amounts shown are the cash flows for current members only, based on the current benefit structure and assuming that all actuarial assumptions are met in each future year. To the extent that actual experience deviates from that expected, results will vary. Amounts are shown in future nominal dollars and have not been discounted to the valuation date.

APPENDIX A

HISTORICAL BACKGROUND

Historical Background

Since 1909, the Omaha School District has maintained a retirement system for its teachers. Since then, systems covering other employees were added. In 1951, the Nebraska Legislature consolidated the existing systems into one new System. Amendments of significance in the Nebraska statutes and federal Social Security Act have occurred from time to time. These changes in order of their occurrence are outlined briefly below:

1951 - New System

Prior to 1951, three separate retirement systems existed. In 1951 the Nebraska Legislature repealed these three separate systems and created the present single System covering all employees. This act provided, however, that a member of a pre-existing system might elect to retain his benefit and contribution rights under one of the former systems in lieu of the new System benefits and contributions. The members who so elected then became known by the following titles for retirement purposes:

(1)   Employees covered by the former Omaha Teachers Retirement System were known as "Teachers,"

(2)   Employees covered by the former Non-Teaching Employee Retirement System were known as "Non-Teachers,"

(3)   Employees covered by the former Cafeteria Employee Retirement System were known as "Cafeteria."

All other employees became members of the new System and received credit for membership service starting September 1, 1951. Benefits as well as contributions under the new System became directly related to a member's compensation by formula. The maximum covered annual compensation under the new System became $5,000, but the maximum for Teachers, Non-Teachers and Cafeteria remained $3,000.

1955 Amendments

On September 24, 1955, Omaha School employees voted to become participants in the federal Social Security program. All Social Security benefits are payable in addition to the System benefits. As a result of Social Security coverage, changes were made in the benefit and contribution formulas of the System effective August 31, 1955. In general, the changes reduced contributions and benefits to 60% of the rates formerly in effect. In addition, the maximum covered compensation was increased from $5,000 to $6,000 except for Teachers, Non-Teachers and Cafeteria which remained at $3,000.

The amount contributed by the School District was also reduced to 60% of the rates in effect prior to the change and the School District's contributions, matching the refunds paid upon the withdrawal or death of employees, were retained in the retirement fund rather than being returned to the School District.

1963 Amendments

Effective September 1, 1963, several changes were made in the new System. The limit on covered compensation for contributions and benefits of members was removed.

The service retirement annuity credit was increased in order to integrate with the modifications in federal Social Security between 1955 and 1963. The disability annuity for members was increased to 100% of the service retirement annuity accrued to date of disability and the restriction as to the number of years for which it was payable was removed. The offset in the benefit formula for the Nebraska State Service Annuity credit was placed on a year-to-year basis for all members, increasing the annuity credit for service after September 1, 1951 for active and retired alike.

The employees who were participating as Teachers, Non-Teachers and Cafeteria began to make contributions and receive benefit credits at the same rates as other members of the System. It should be noted that any employee who retained rights under a pre-existing system still receives credit in accordance with the provisions of the former system if this is more than the credit, after the State service annuity offset, would be under the 1963 amendments.

The contribution rate for employees was changed to integrate with the modifications in Social Security and was no longer subject to revision depending upon the degree of actuarial soundness of the System as had been provided in 1962. The School District became solely responsible for maintaining the solvency of the System on the basis of annual actuarial valuations. The School District again became entitled to refunds equal to the refunds paid upon withdrawal or death of employees.

The restriction prohibiting the crediting of interest on refunds to employees who withdraw from employment during the first ten years of service was removed. Thus, all employees who withdraw after one year or more of service receive interest on their contributions made since September 1, 1951.

1965 Amendments

Effective September 1, 1965, a pre-retirement survivor's annuity was added to the System for long-service employees. This change gave an employee with 25 or more years of service protection at death approximately equivalent in value to the vesting which already existed at termination of employment for an employee with the same period of service.

Effective January 1, 1966, the Social Security tax base was increased from $4,800 to $6,600 per year. This change became effective in the System's contribution and benefit formulas as of September 1, 1966.

1967 Amendments

The 77th Session of the Nebraska Legislature enacted LB 494 which amended the Nebraska School Retirement System, effective October 23, 1967. A major change was the increase in the State service annuity credit from $1.50 to $3.00 per month for each year of credited service after July 1, 1968 and the removal of the 35 year limitation on credited State service. For the purpose of determining the new State service annuity offset in calculating the net Omaha annuity, the additional $1.50 per month for each year of service after July 1, 1968 is not applicable, but removal of the 35 year limitation does apply. This means that the State service annuity offset is still determined on the basis of $1.50 per month for each year of service. The increase in the State service annuity offset by virtue of eliminating the 35 year limitation represents a lower cost to the Omaha System for those members having more than 35 years of State service by age 65.

Another change with regard to the State service annuity was the manner in which the funds are transferred from the State to the Omaha System to pay these annuities. For retirements occurring after the effective date of the amendments (October 23, 1967), the State transfers the commuted value (equivalent single sum) of the individual State service annuity to the Omaha System and then the payment of the monthly annuity to the retired member is the School District's responsibility.

In 1967 the eligibility provisions for the pre-retirement survivors' annuity and the vested retirement rights were changed, reducing the service required from 25 years to 20 years and thereby granting these options to a larger number of employees.

Effective January 1, 1968, the federal Social Security taxable wage base was increased from $6,600 to $7,800 per year. This change became effective in the System's contribution and benefit formulas as of September 1, 1968.

1969 Amendments

The 80th Session of the Nebraska Legislature enacted LB 530 which amended the System effective August 11, 1969. The provisions of this bill improved the benefit structure of the System in two ways. The membership annuity credits (credits after 9/1/51) were increased approximately 10% and the Social Security wage base was "frozen" at the $7,800 level for purposes of calculating benefit credits and employee contributions.

By freezing the Social Security base, benefit credits and employee contributions for service after September 1, 1969 will not be reduced by virtue of future increases in the Social Security wage base. The System benefits will remain integrated with the Social Security program at the level provided by the $7,800 base.

1972 Amendments

During 1972, the Nebraska Legislature enacted LB 1116 which amended the System. These amendments were to become effective for retirements occurring on or after September 1, 1972. The provisions of this bill improved the benefit structure of the System and liberalized the eligibility condition for qualification upon termination for the deferred vested retirement benefit.

The benefits of the System were improved by increasing the membership annuity credits (credits after 9/1/51) by approximately 20% over those in existence on September 1, 1971.

In order to be eligible upon resignation to elect a deferred vested service annuity, the years of creditable service was reduced from 20 years to 15 years.

1973 Amendments

The 1973 Session of the Nebraska Legislature enacted LB 445 which created increases in the State service annuity of the Nebraska School Retirement System. LB 445 provides for (a) a State service annuity credit of $3.00 per month for each year of creditable service for all emeritus members and for all full time school employees who retire on or after July 1, 1973 and (b) for increases in the State service annuity for members who retired prior to July 1, 1973 based upon the difference between the Consumers Price Index on the date of retirement and July 1, 1973.

1976 Amendments

The 1976 Session of the Nebraska Legislature enacted LB 994 which increased the membership annuity credits (credits after 9/1/51) by 20%.
The members' contributions were increased to 2.90% of compensation up to $7,800 per year plus 5.25% of salary in excess of that amount.

1979 Amendments

The 1979 Session of the Nebraska Legislature changed the mandatory retirement date from age 65 to age 70. Late retirement benefits are actuarially increased from what would have been payable at the normal retirement date.

1982 Amendments

The 1982 Session of the Nebraska Legislature enacted LB 131 which made considerable changes to the System. LB 131 was approved by the Governor on February 19, 1982.

The most major revision in the System was to change the previous primary benefit formula from the step rate formula based on each year of salary to a final average compensation formula. The primary benefit formula became 1.5% of final average compensation for each year of creditable service not in excess of 30. Final average compensation was then defined to be 1/36 of the total compensation received during the three fiscal years of highest compensation. Also, the creditable service not in excess of 30 years was allowed to continue to accrue after the fiscal year in which the employee attains age 65. In addition, the State service annuity offset of $1.50 per year of creditable service was removed with respect to the final average compensation formula. The prior provisions of the System were retained as a minimum benefit, recognizing creditable service for those provisions through the earlier of the date of retirement or August 31, 1983.

Another major revision in the System was to change the step rate formula for employee contributions to a level 4.90% of compensation. In addition, the provision entitling the School District to receive refunds of its own contributions equal to the contributions refunded to employees was removed.

The early retirement date was liberalized. Previously an employee needed to have either 35 years of creditable service or to have attained age 60 with 25 years of creditable service. Now an employee can retire early if he has at least 10 years of creditable service and has attained age 55.

The actuarial equivalent of the annuity payable at the end of the fiscal year in which the employee attains age 65 was changed in the following two ways:

1. For employees retiring before age 62, the monthly formula retirement annuity is a reduced amount based on the actuarial equivalent of the annuity deferred to the employee's 62nd birthday. If retirement is at age 62 or later, there is no actuarial reduction. Previously there was an actuarial reduction, based on the benefit deferred to age 65, for any retirement before age 65.

2. For employees retiring on or after age 65, the monthly formula retirement annuity is to be based on total years of creditable service (not in excess of 30) and the employee's entire compensation history at date of retirement. Consequently, for retirements after the fiscal year in which the employee attains age 65 there is no longer an actuarial increase from the benefit available at the normal retirement date.

The eligibility provision to elect a deferred vested service annuity upon resignation was changed from 15 years of creditable service to 10 years.

1983 Amendments

The 1983 Session of the Nebraska Legislature enacted LB 488 which created benefit increases effective September 1, 1983 for members having retired before February 21, 1982. The amount of benefit increase was limited to the smaller of:

1.　　The percentage increase in the Consumer Price Index for all Urban consumers from the effective date of retirement to June 30, 1983 applied to benefits being paid and

2.　　The sum of $1.50 per month for each year of creditable service and $1.00 per month for each completed year of retirement from the effective date of retirement to June 30, 1983, actuarially adjusted for joint and survivor elections.

1985 Amendments

The 1985 Session of the Nebraska Legislature enacted LB 215 which removed the 30 year limit on years of service used in the benefit formula, provided for vesting after five years of service rather than ten years, and reduced the eligibility period for disability from ten years of service to five years of service.

LP215 also provided for the employer "pick up" of employee contribution under IRC 414(h), thereby allowing employee contributions to be made on a pre-tax basis.

Unisex factors are now being used for determining early retirement reductions and actuarial equivalents for joint and survivor optional benefits.

1986 Amendments

The 1985 Session of the Nebraska Legislature enacted LB 1048 which granted increases in benefits for most retirees to reflect cost-of-living increases over the last several years. The increases ranged up to a maximum of 10.5%.

1987 Amendments

A "window of opportunity" was created for the buy-in or buy-back of service credits for participants qualifying for that right.

1989 Amendments

LB 237 was enacted by the 1989 Session of the Nebraska Legislature and provided: annual benefit accruals of 1.65% of final average compensation (up from 1.50%), unreduced benefits if a member retires with 35 or more years of service, a five year certain and life thereafter annuity as the normal form of benefit (instead of just a life annuity), employee contributions of 5.8% of pay (up from 4.9%), and increased benefits to retirees (the increases ranged up to 9.0%). There were some other changes as a result of this bill, but none that had a direct actuarial cost impact.

1992 Amendments

The 1992 Session of the Nebraska Legislature enacted LB 1001 which increased annual benefit accruals from 1.65% of final average compensation to 1.70%, and increased benefits to retirees (3% increase per year of retirement, not exceeding 9% total increase), a change in the preretirement joint and survivor option to allow it to become effective automatically after 20 years of service, and allowed employees to "buy-in" their time with other public school systems by means of a tax-deferred rollover of their refund from that System.

1995 Amendments

The 1995 Session of the Nebraska Legislature enacted LB 505 which increased annual benefit accruals from 1.70% to 1.80% of final average compensation. It also provided for unreduced retirement benefits when the sum of age and service equals or exceeds 85 (still maintaining the age 55 minimum), and reduced early retirement reductions to .25% per month prior to age 62. Early retirement at 84, 83, or 82 points is also allowed with a maximum reduction of 3%, 6% and 9% respectively. Employee contributions were increased to 6.3% of pay. The bill also provided for a one time increase to current retirees of 3% per year since retirement (not to exceed 9%), or if larger, 90% restoration of the purchasing power of their original pension. There are other changes resulting from this bill, which are not included since they did not have a direct actuarial impact. One change with no actuarial impact but worth noting is the provision for employer "pick up" of employee contributions to the System used to buy in outside service, pursuant to Section 414(h) of the Internal Revenue Code.

1998 Amendments

The 1998 Session of the Nebraska Legislature enacted LB 497 which increased annual benefit accruals from 1.80% to 1.85% of final average compensation. The bill also provided for a one time increase to current retirees of 3% per year since retirement (not to exceed 9%) and provides an annual automatic cost of living adjustment, not greater than 1.5%, beginning January 1, 2000.

2000 Amendments and Cost of Living Adjustment

The 2000 session of the Nebraska Legislature enacted LB 155 which increased accruals from 1.85% to 2.00% of final average compensation.

Pursuant to LB 497, the OSERS Board and the Omaha School District Board authorized a 1.5% discretionary COLA beginning January 1, 2000 in addition to the automatic COLA.

2001 Amendments and Cost of Living Adjustment

The 2001 session of the Nebraska Legislature enacted LB 711 which provided that certain members who previously left employment due to pregnancy could purchase their "lost" service. It also provided a post-retirement supplemental benefit to assist with medical costs. The supplement commences 10 years after retirement, beginning at $10 per month for each year retired and increasing by $10 each year to a maximum of $250 per month. For retirees with less than twenty years of service, the benefit is reduced proportionately.

Additionally, the OSERS Board and the Omaha School Board authorized a discretionary COLA to restore full purchasing power, beginning January 1, 2001, in addition to the automatic COLA.

2002 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2002.

2003 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2003.

2004 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2004.

2005 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2005.

2006 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2006.

2007 Amendment and Cost of Living Adjustment

The 2007 session of the Nebraska Legislature enacted Section 79-9, 113 which changed the employee contribution rate from 6.30% of compensation to 7.30% and provided for an employer contribution equal to 101% of the employee contribution rate.

The automatic 1.5% COLA was granted beginning January 1, 2007.

2008 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2008.

2009 Amendment and Cost of Living Adjustment

The 2009 session of the Nebraska Legislature enacted Legislative Bill 187 (LB 187), which increased the State's contribution from 0.7% to 1.0% of covered pay from July 1, 2009 to July 1, 2014. On July 1, 2014 the State's contribution returns to 0.7%. LB 187 also increased the employee contribution rate from 7.30% of compensation to 8.30%. The School District's contribution is equal to 101% of the employee contribution rate so the District's contribution rate increased from 7.373% of compensation to 8.383% as a result of the increase in the member contribution rate.

The automatic 1.5% COLA was granted beginning January 1, 2009.

2010 Amendment and Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2010.

2011 Amendment and Cost of Living Adjustment

The 2011 session of the Nebraska Legislature enacted Legislative Bill 382 (LB 382), which increased the Member's contribution from 8.30% of compensation to 9.30%. The School District's contribution is equal to 101% of the employee contribution rate so the District's contribution rate increased from 8.383% of compensation to 9.393% as a result of the increase in the member contribution rate. LB 382 also extended the 1% of payroll contribution by the State from July 1, 2014 to July 1, 2017.

The automatic 1.5% COLA was granted beginning January 1, 2011.

2012 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2012.

2013 Amendments and Cost of Living Adjustment

The 2013 session of the Nebraska Legislature enacted Legislative Bill 553 (LB 553), which increased the Member contribution rate from 9.30% of pay to 9.78% of pay. The School District's contribution is equal to 101% of the employee contribution rate so the District's contribution rate increased from 9.393% of pay to 9.878% of pay as a result of the increase in the member contribution rate. LB 553 also ended the scheduled decrease in the State contribution rate and instead increased the State contribution from 1.0% of pay to 2.0% of pay, effective July 1, 2014. LB 553 also created a new benefit structure for members hired on or after July 1, 2013. For these members, annual cost of living adjustments will be the lesser of 1.0% or CPI, and the final average compensation is defined as 1/60 of the total compensation received during the five fiscal years of highest compensation.

The automatic 1.5% COLA was granted beginning January 1, 2013.

2014 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2014.

2015 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2015.

2016 Amendments and Cost of Living Adjustment

The 2016 session of the Nebraska Legislature enacted Legislative Bill 447 (LB 447), which created a new benefit structure for members hired on or after July 1, 2016. The changes result in the same benefit structure for new OSERS members as for new members of the Nebraska School Retirement System. These members will not receive the supplemental medical COLA offered to employees hired before July 1, 2016. Other changes for these employees include a revised early retirement benefit reduction schedule and different retirement eligibility requirements.

The automatic 1.5% COLA was granted beginning January 1, 2016.

2017 Cost of Living Adjustment

The automatic 1.5% COLA was granted beginning January 1, 2017.

2018 Amendments and Cost of Living Adjustment

The 2017 session of the Nebraska Legislature enacted Legislative Bill 415 (LB 415), which created a new benefit structure for members hired on or after July 1, 2018. The changes result in the same benefit structure for new OSERS members as for new members of the Nebraska School Retirement System. The changes for these employees include a revised early retirement benefit reduction schedule and different retirement eligibility requirements.

The 2018 session of the Nebraska Legislature enacted Legislative Bill 1005 (LB 1005), which also affects the benefit provisions for members hired on or after July 1, 2018. As a result of LB 1005, the Board has the authority to set the actuarial assumptions used to determine the benefit amounts payable under optional forms of payment for members hired on or after July 1, 2018.

The automatic 1.5% COLA was granted beginning January 1, 2018.

APPENDIX B

SUMMARY OF PLAN PROVISIONS

APPENDIX B – SUMMARY OF PLAN PROVISIONS

Contributions

Employee Contributions: Employees contribute 9.78% of compensation, effective September 1, 2013. Such contributions are payable each year while employed. Contributions accumulated with interest are refundable at resignation unless the vested retirement benefit has been elected and at death unless the pre-retirement survivor's benefit has been elected.

State Contribution: The State contributes annually an amount equal to 2.0% of the members' compensation, effective July 1, 2014.

School District Contribution: The School District contributes the greater of (a) one hundred and one percent of the contributions by the employees or (b) such amount as may be necessary to maintain the solvency of the system, as determined annually by the board upon recommendation of the actuary and the trustees.

Interest Credited on Refunds: Contributions made prior to September 1, 1951 and refunded at withdrawal or death are not credited with interest. Contributions after September 1, 1951 are credited with interest at the rate declared annually by the Board of Education upon the recommendation of the Board of Trustees.

Benefits

General: The System provides annuities upon retirement from service or disability and upon death to designated survivors.

The service retirement formula is 2.0% per year of creditable service times the final average compensation.

Final average compensation is defined as 1/36 of the total compensation received during the three fiscal years of highest compensation for members hired before July 1, 2013. For members hired on or after July 1, 2013, final average compensation is defined as 1/60 of the total compensation received during the five fiscal years of highest compensation.

Annuities are paid for life, with 5 years guaranteed. Optional forms of payment are available.

The disability annuity, the pre-retirement survivor annuity and the vested retirement right are summarized in the following sections.

Benefits in pay status are subject to an annual cost of living adjustment equal to the lesser of 1.5% or CPI for members hired before July 1, 2013. There is an additional COLA if surplus assets exist beginning January 1, 2000. Effective October 3, 2001, a medical cost of living adjustment is payable to retired members. Such amount will commence 10 years after retirement and shall be an amount equal to $10 per month for each year retired (subject to a maximum of $250 per month), prorated for years of service less than 20. For members hired on or after July 1, 2013, the annual cost of living adjustment is capped at 1.0%.

Members hired on or after July 1, 2016 are not eligible to receive the medical COLA benefit.

Retirement Annuities: An employee <u>hired before July 1, 2016</u> may begin receiving a retirement benefit once the employee has left the employment of the School district, selected a retirement date and

    (a)   has completed 35 years of creditable service,

    or

    (b)   has 10 years of creditable service (with at least five of those years being creditable Omaha service) and attained age 55,

    or

    (c)   remained employed until his or her 65th birthday and completed at least five years of creditable Omaha service.

If an employee who was hired before July 1, 2016 begins receiving an annuity after age 62, or when age and service equals or exceeds 85, there is no adjustment for the retirement annuity. If, however, such employee begins receiving an annuity before age 62, the annuity shall be reduced by 0.25% for each month prior to age 62, but if 84 points have been achieved then the reduction is limited to 3%, if 83 points, 6%, and 82 points, 9%.

An employee <u>hired on or after July 1, 2016 and before July 1, 2018</u> may begin receiving a retirement benefit once the employee has left the employment of the School district, selected a retirement date and

    (a)   has attained age 55 and the sum of the member's attained age and creditable service totals 85,

    or

    (b)   has 5 years of creditable service and attained age 60.

For employees who were hired on or after July 1, 2016 and before July 1, 2018, if an employee begins receiving an annuity before age 65, such annuity shall be reduced by 0.25% for each month prior to age 65. If, however, the employee has achieved 85 points and is at least age 55, then there is no reduction to the annuity.

An employee <u>hired on or after July 1, 2018</u> may begin receiving a retirement benefit once the employee has left the employment of the School district, selected a retirement date and

    (a)   has attained age 60 and the sum of the member's attained age and creditable service totals 85,

    or

    (b)   has 5 years of creditable service and attained age 60.

For employees who were hired on or after July 1, 2018, if an employee begins receiving an annuity before age 65, such annuity shall be reduced by 0.25% for each month prior to age 65. If, however, the employee has achieved 85 points and is at least age 60, then there is no reduction to the annuity.

Disability Retirement Annuities: Each employee who becomes totally disabled and who has completed five or more years of creditable Omaha service is entitled to a disability retirement annuity equal to the amount of service annuity earned to date of disability. Alternatively, the employee may defer the disability retirement and accrue service and compensation increases in the interim. The disability retirement annuity is payable each month until disability ceases, if before unreduced retirement, or death.

Pre-Retirement Survivor Annuities: Upon the death of a member who has completed 20 or more years of creditable service and who has not retired, a pre-retirement survivor annuity shall be paid to the member's primary beneficiary. The survivor must be a spouse or one other person whose attained age in the calendar year of the member's death is no more than 10 years less than the attained age of the member in such calendar year. The survivor annuity is the actuarial equivalent of the member's annuity accrued to the date of death, determined on the basis of the member's and beneficiary's attained ages on said date. The survivor annuity is payable in lieu of a refund of the member's accumulated contributions. However, a member may elect out of the survivor annuity and specify that such a refund be paid in lieu of the annuity. An election out of the pre-retirement survivor annuity is entirely independent of the election of a joint and survivor option at retirement. Within 60 days after the member's death, the beneficiary may request a refund of the member's accumulated contributions instead of the annuity; provided, however, that the member may direct the System to pay only an annuity.

If the member (not retired) has less than 20 years of creditable service, or the beneficiary does not meet the requirements stated above, a refund of the member's accumulated contributions shall be paid.

Vested Retirement Right: Each employee who has completed five or more years of creditable Omaha service is eligible upon resignation to elect a deferred vested benefit, first payable as an unreduced amount at age 65, in lieu of a refund of his accumulated contributions. With ten or more years of total creditable service (including at least five years of creditable Omaha service), the deferred vested benefit could commence, unreduced, at age 62 for employees who were hired before July 1, 2016. If benefits start before age 62 (but not earlier than attained age 55), the benefit shall then be reduced as described above.

For employees who were hired on or after July 1, 2016 and before July 1, 2018, the deferred vested benefit could commence, unreduced, at age 65. If benefits start before age 65 (but not earlier than attained age 55), the benefit shall then be reduced as described above.

For employees who were hired on or after July 1, 2018, the deferred vested benefit could commence, unreduced, at age 65. If benefits start before age 65 (but not earlier than attained age 60), the benefit shall then be reduced as described above.

APPENDIX C

ACTUARIAL ASSUMPTIONS AND METHODS

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

The valuation assumptions and methods used in conducting the current actuarial valuation are as follows:

Actuarial Assumptions

Investment Return Assumption:
    7.50% per annum, compounded annually, net of expenses.

Mortality Rates:
    RP-2014 Mortality Table for males, set forward one year.
RP-2014 Mortality Table for females, set back one year.

Future mortality rates are projected on a generational basis using Scale MP-2016, which reflects the expectation that mortality rates will decline over time.

Disabled retirees use the RP-2014 Disabled Retiree Mortality Table, without generational improvement.

Disability:
    None assumed.

Termination of Employment:
(prior to retirement eligibility)
    Illustrative rates of termination are as follows:

Certificated:

Percent Terminating	
Duration	Rate
1	11.25%
5	8.00
10	4.50
15	2.25
20	1.00
25	1.00

Classified:

Percent Terminating		
Duration	Male	Female
1	11.00%	15.00%
5	6.00	9.00
10	2.40	4.00
15	1.00	1.75
20	1.00	1.00
25	1.00	1.00

Retirement Rates:

Early retirement rates are assumed to occur according to the schedule illustrated below:

Certificated:		Classified:	
Age	Early	Age	Early
55	10%	55	3%
56	6	56	3
57	6	57	3
58	6	58	3
59	8	59	3
60	12	60	5
61	12	61	10

Unreduced retirement rates are assumed to occur according to the schedule illustrated below:

Certificated:

Age	1st Year Eligible	Ultimate
55	60%	
56	50	35%
57	45	35
58	45	35
59	45	25
60	35	25
61	25	25
62	25	25
63	25	25
64	30	30
65	35	35
66	35	35
67	35	35
68	35	35
69	100	35
70	100	100

Classified:

Age	1st Year Eligible	Ultimate
55	20%	
56	10	12%
57	10	12
58	10	12
59	15	12
60	15	12
61	15	20
62	20	20
63	20	20
64	20	20
65	25	35
66	20	23
67	20	23
68	20	23
69	20	23
70	100	100

Deferred vested members are assumed to retire at first unreduced retirement age.

Salary Scale: Salaries are assumed to increase according to the schedule illustrated below:

	Annual Salary Increase	
Duration	Certificated	Classified
0	5.75%	6.25%
1	5.75	5.75
2	5.75	5.25
3	5.75	5.00
4-6	5.75	4.75
7-11	5.75	4.25
12-14	5.75	3.75
15-21	5.25	3.75
22+	4.25	3.75

Note: Salaries are assumed to increase by 2.0% for members who have not yet finalized their contract negotiations as of the valuation date.

Pre-Retirement Survivor Annuity: It is assumed that females are three years younger than males, and that all members are married.

Probability of Electing a Refund: The proportion of terminating vested members electing a refund of member contributions:

20% for Certificated members
40% for Classified members

Assumed Interest Rate Credited
on Employee Contributions: 2.75% compounded annually.

Inflation (CPI):   2.75% compounded annually.

Total Payroll Growth: 3.25% compounded annually.

Decrement Timing: Middle of year

Cost of Living Adjustments: 1.5% for members hired before 7/1/2013
1.0% for members hired on or after 7/1/2013

Actuarial Cost Method

The actuarial cost method is a procedure for allocating the actuarial present value of pension plan benefits and expenses to time periods. The method used for the valuation is known as the individual entry-age actuarial cost method, and has the following characteristics.

(i)   The annual normal costs for individual active member are sufficient to accumulate the value of the member's pension at time of retirement.

(ii)   Each annual normal cost is a constant percentage of the member's year-by-year projected pensionable compensation.

The entry-age actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's pensionable compensation between the entry-age of the member and the assumed exit-ages.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called the actuarial accrued liability. Deducting accrued assets from the actuarial accrued liability determines the unfunded actuarial accrued liability (UAAL).

Asset Valuation Method

Assets are valued at expected value at the valuation date plus 25% of the difference between the market value and expected value. As a starting point for implementation of this asset valuation method, the actuarial value of assets as of September 1, 1996 was set equal to the market value. As of September 1, 2007, the actuarial value was again reset to market value. The smoothing method was again implemented in the 2008 valuation. Effective September 1, 2008, the actuarial value must fall within a corridor of 80% to 120% of market value.

UAAL Amortization Method

Effective with the January 1, 2017 valuation, OSERS amortizes the UAAL using a "layered" approach. Under this method, the UAAL is split into pieces; the first piece is amortized over, as a level-percent of pay, over a closed 30-year period beginning with the September 1, 2013 valuation (so 26 years remain as of the January 1, 2018 valuation). All ensuing UAAL bases that result from future actuarial experience will be amortized, as a level-percent of pay, over a new 25-year period commencing on the respective valuation date.

APPENDIX D

MEMBERSHIP DATA

SUMMARY OF MEMBERSHIP DATA

	Active	Inactive Vesteds	Nonvested Terminations	Retirees	Beneficiaries	Disabled Members	Total
Members on 1/1/2017	7,462	1,035	347	4,278	247	17	13,386
Terminated – vested	(137)	137	0	0	0	0	0
Terminated – refund due	(177)	0	177	0	0	0	0
Terminated – refunded	(196)	(79)	(97)	0	0	0	(372)
Retired	(216)	(24)	0	241	0	(1)	0
Disability retirement	(2)	(2)	0	0	0	4	0
Death	(11)	(2)	0	(113)	(12)	0	(138)
Payments ended	0	0	0	0	(6)	0	(6)
New beneficiaries	0	0	0	0	23	0	23
New Alternate Payees	0	0	0	0	0	0	0
New members	767	0	43	0	0	0	810
Rehires	79	(22)	(57)	0	0	0	0
Corrections/adjustments	0	0	0	0	0	0	0
Members on 1/1/2018	7,569	1,043	413	4,406	252	20	13,703

There were 125 active members who were part of a bargaining group that did not have a settled contract as of the date the data was received. This group included security employees. At the direction of OSERS staff, we assumed that these groups will receive a 2.0% increase effective January 1, 2018.

HISTORICAL SUMMARY OF MEMBERS

The following table displays selected historical data that was used in the actuarial valuation for the System.

Valuation Date January 1*	Total Count	Active Members						Number			Act/Ret Ratio
		Number	Average Age	Entry Age	Service	Annual Pay ($)	Pay Increase	Inactive Vested	Inactive Nonvested	Retired	
1998	8,204	5,680	44.2	33.7	10.5	28,912		330		2,194	2.59
1999	8,564	5,864	43.9	34.0	9.9	29,493	2.01%	386		2,314	2.53
2000	8,885	6,057	43.8	34.1	9.7	30,544	3.56%	380		2,448	2.47
2001	9,156	6,259	44.0	34.4	9.6	32,091	5.06%	368		2,529	2.47
2002	9,409	6,383	43.9	34.5	9.4	33,406	4.10%	384		2,642	2.42
2003	9,425	6,279	44.0	34.5	9.5	33,877	1.41%	385		2,761	2.27
2004	9,711	6,399	44.2	34.6	9.6	34,698	2.42%	473		2,839	2.25
2005	10,124	6,623	44.1	34.8	9.3	35,234	1.54%	485		3,016	2.20
2006	10,522	6,972	44.1	34.9	9.2	35,732	1.41%	442		3,108	2.24
2007	10,769	7,041	44.2	35.1	9.1	36,720	2.77%	483		3,245	2.17
2008	11,228	7,313	44.2	35.2	9.0	37,725	2.74%	515		3,400	2.15
2009	11,480	7,438	44.5	35.5	9.0	38,686	2.55%	553		3,489	2.13
2010	11,644	7,491	44.7	35.4	9.3	39,152	1.20%	566		3,587	2.09
2011	11,602	7,215	45.1	35.2	9.9	40,394	3.17%	680		3,707	1.95
2012	11,881	7,315	44.9	35.0	9.9	40,793	0.99%	723		3,843	1.90
2013	12,152	7,372	44.9	34.9	10.0	41,731	2.30%	813		3,967	1.86
2014	12,477	7,415	44.7	34.8	9.9	42,427	1.67%	937		4,125	1.80
2015	12,938	7,393	44.5	34.7	9.8	44,050	3.83%	984	210	4,351	1.70
2017	13,386	7,462	44.5	34.1	10.4	44,998	2.15%	1035	347	4,542	1.64
2018	13,703	7,569	44.5	34.1	10.4	46,233	2.74%	1,043	413	4,678	1.62

* Years prior to 2017 have a valuation date of September 1.

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Total

Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	229	0	0	0	0	0	0	0	229
25 to 29	792	83	0	0	0	0	0	0	875
30 to 34	437	366	92	0	0	0	0	0	895
35 to 39	297	227	386	83	0	0	0	0	993
40 to 44	220	132	186	280	33	0	0	0	851
45 to 49	205	142	174	204	153	22	1	0	901
50 to 54	170	127	151	142	112	127	20	2	851
55 to 59	172	122	168	156	105	89	47	4	863
60 to 64	185	109	140	122	101	54	18	14	743
65 & Up	78	63	64	66	33	38	10	16	368
Total	2,785	1,371	1,361	1,053	537	330	96	36	7,569
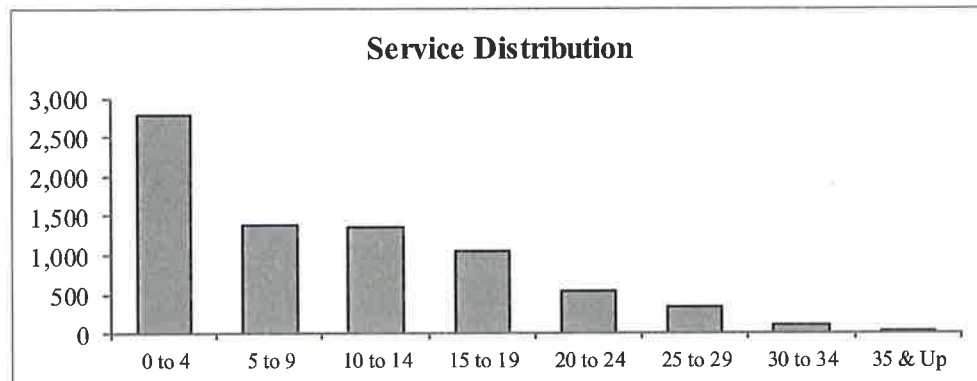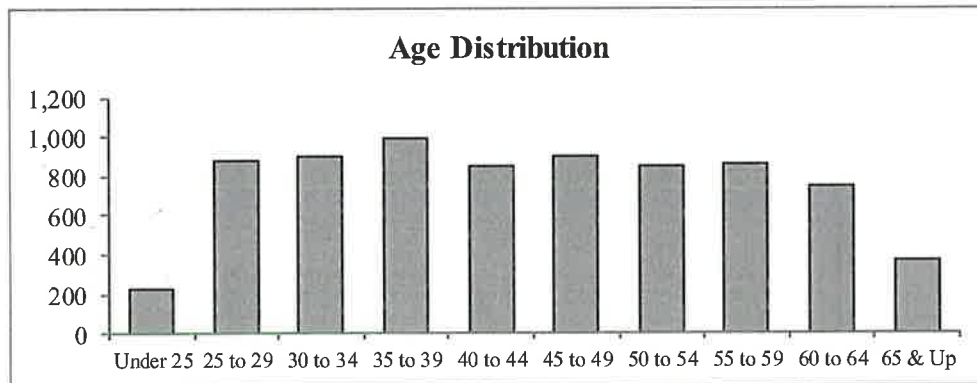
(Service spans columns 0 to 4 through 35 & Up)

Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Certificated - Total

Age	Service 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	137	0	0	0	0	0	0	0	137
25 to 29	585	65	0	0	0	0	0	0	650
30 to 34	300	298	74	0	0	0	0	0	672
35 to 39	187	183	359	72	0	0	0	0	801
40 to 44	125	97	156	251	28	0	0	0	657
45 to 49	106	87	116	166	140	19	1	0	635
50 to 54	64	52	82	89	84	117	15	1	504
55 to 59	59	43	73	74	55	68	36	2	410
60 to 64	51	40	57	53	43	24	9	7	284
65 & Up	25	18	12	28	10	15	6	8	122
Total	1,639	883	929	733	360	243	67	18	4,872

Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Certificated - Tier 1

Age	Service 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	0	0	0	0	0	0	0	0	0
25 to 29	4	64	0	0	0	0	0	0	68
30 to 34	3	298	73	0	0	0	0	0	374
35 to 39	6	182	359	72	0	0	0	0	619
40 to 44	2	97	155	251	28	0	0	0	533
45 to 49	2	87	116	166	140	19	1	0	531
50 to 54	1	52	81	89	84	117	15	1	440
55 to 59	1	42	73	74	55	68	36	2	351
60 to 64	1	40	56	53	43	24	9	7	233
65 & Up	1	18	12	28	10	15	6	8	98
Total	21	880	925	733	360	243	67	18	3,247
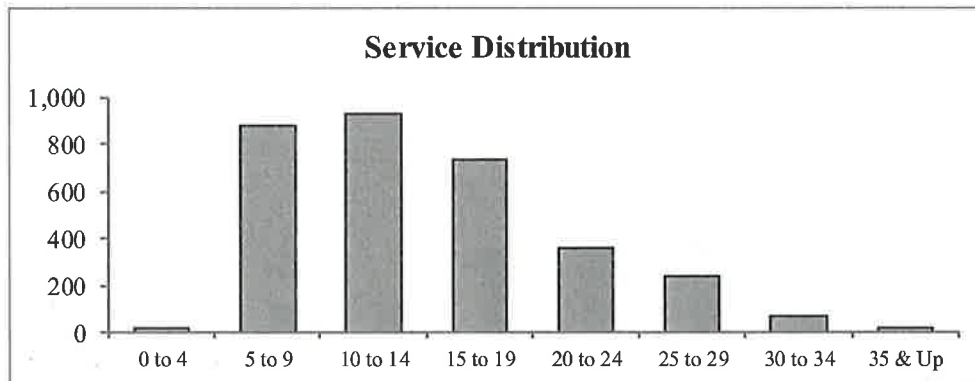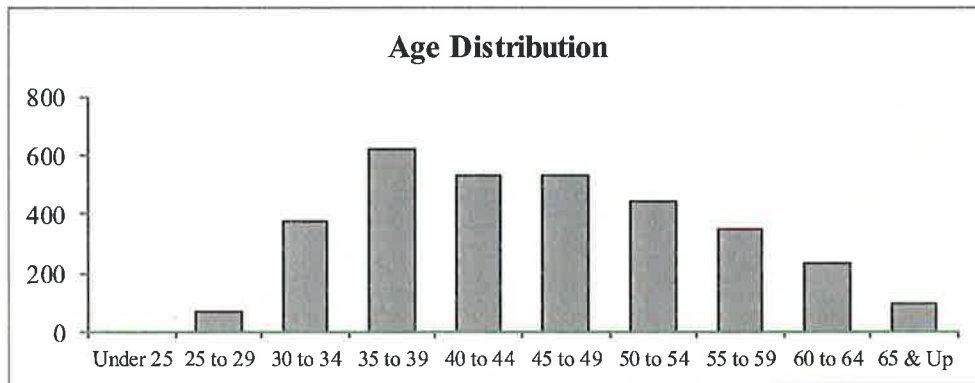
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Certificated - Tier 2

Age	Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	11	0	0	0	0	0	0	0	11
25 to 29	363	1	0	0	0	0	0	0	364
30 to 34	201	0	1	0	0	0	0	0	202
35 to 39	125	1	0	0	0	0	0	0	126
40 to 44	88	0	1	0	0	0	0	0	89
45 to 49	61	0	0	0	0	0	0	0	61
50 to 54	49	0	1	0	0	0	0	0	50
55 to 59	36	1	0	0	0	0	0	0	37
60 to 64	33	0	1	0	0	0	0	0	34
65 & Up	14	0	0	0	0	0	0	0	14
Total	981	3	4	0	0	0	0	0	988
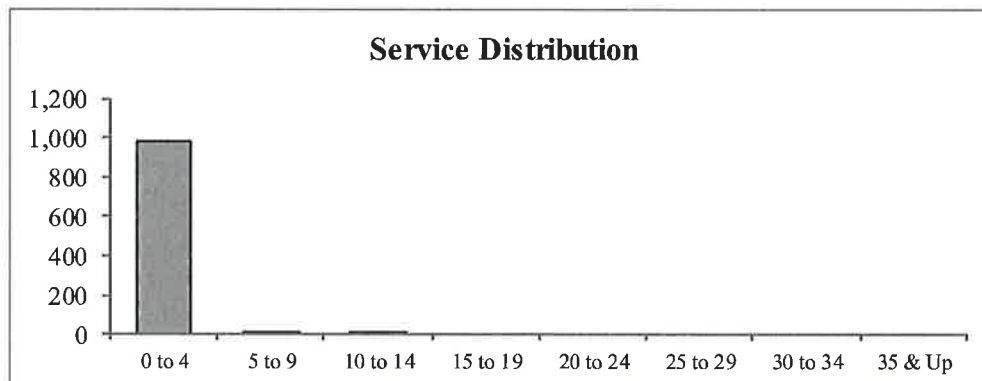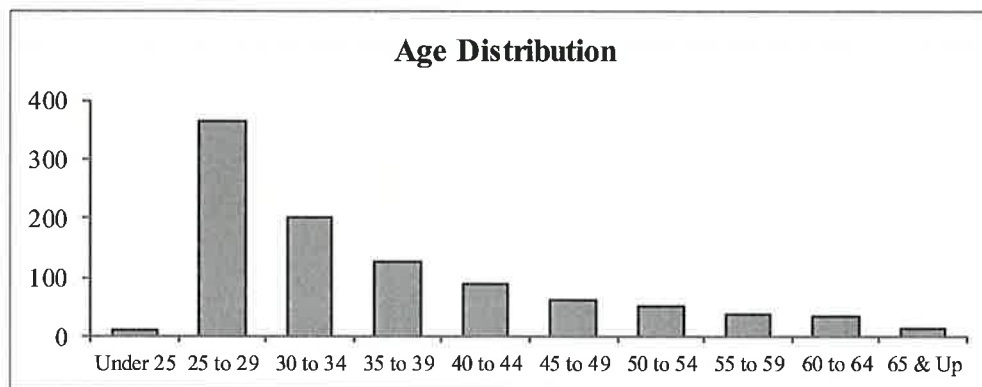
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Certificated - Tier 3

Age	Service 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	126	0	0	0	0	0	0	0	126
25 to 29	218	0	0	0	0	0	0	0	218
30 to 34	96	0	0	0	0	0	0	0	96
35 to 39	56	0	0	0	0	0	0	0	56
40 to 44	35	0	0	0	0	0	0	0	35
45 to 49	43	0	0	0	0	0	0	0	43
50 to 54	14	0	0	0	0	0	0	0	14
55 to 59	22	0	0	0	0	0	0	0	22
60 to 64	17	0	0	0	0	0	0	0	17
65 & Up	10	0	0	0	0	0	0	0	10
Total	637	0	0	0	0	0	0	0	637
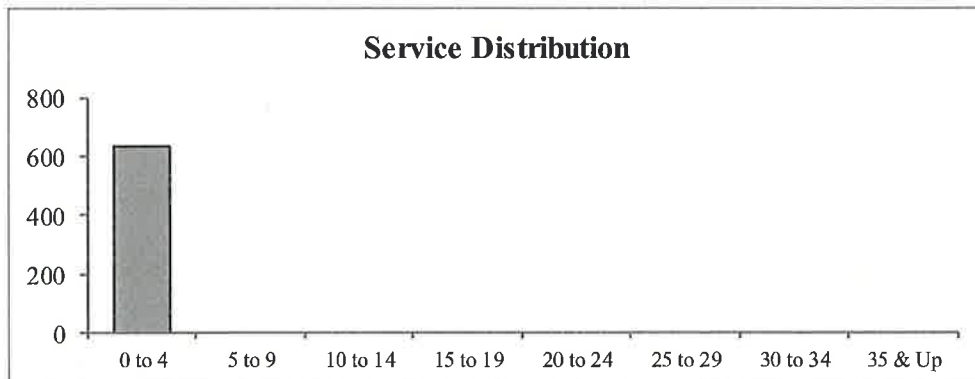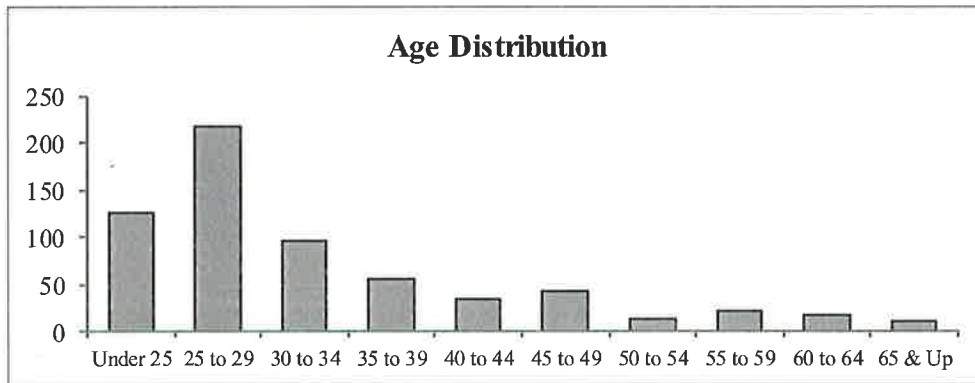
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Classified - Total

Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	92	0	0	0	0	0	0	0	92
25 to 29	207	18	0	0	0	0	0	0	225
30 to 34	137	68	18	0	0	0	0	0	223
35 to 39	110	44	27	11	0	0	0	0	192
40 to 44	95	35	30	29	5	0	0	0	194
45 to 49	99	55	58	38	13	3	0	0	266
50 to 54	106	75	69	53	28	10	5	1	347
55 to 59	113	79	95	82	50	21	11	2	453
60 to 64	134	69	83	69	58	30	9	7	459
65 & Up	53	45	52	38	23	23	4	8	246
Total	1,146	488	432	320	177	87	29	18	2,697
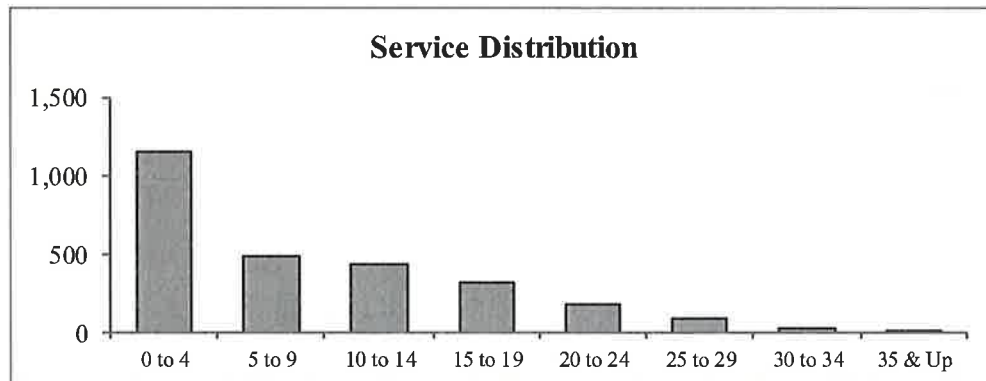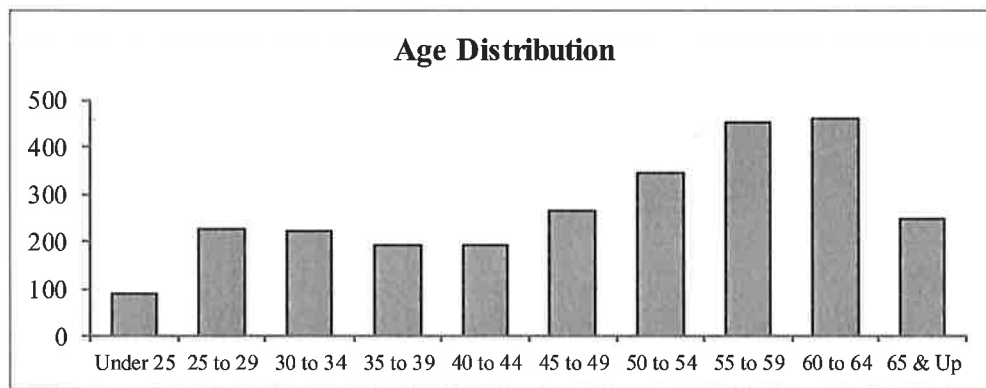

Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Classified - Tier 1

Age	Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	0	0	0	0	0	0	0	0	0
25 to 29	3	18	0	0	0	0	0	0	21
30 to 34	4	68	18	0	0	0	0	0	90
35 to 39	2	44	27	11	0	0	0	0	84
40 to 44	0	35	30	29	5	0	0	0	99
45 to 49	7	55	58	38	13	3	0	0	174
50 to 54	11	75	69	53	28	10	5	1	252
55 to 59	4	78	95	82	50	21	11	2	343
60 to 64	8	69	83	69	58	30	9	7	333
65 & Up	1	45	51	38	23	23	4	8	193
Total	40	487	431	320	177	87	29	18	1,589
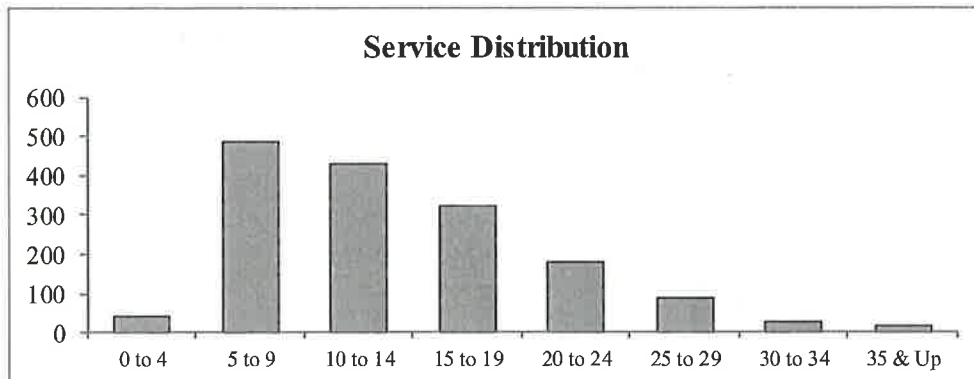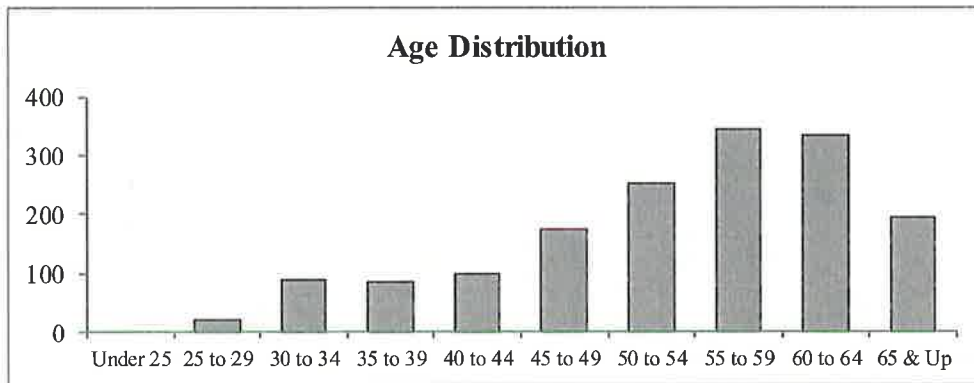
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Classified - Tier 2

Age	Service 0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	Total
Under 25	37	0	0	0	0	0	0	0	37
25 to 29	118	0	0	0	0	0	0	0	118
30 to 34	76	0	0	0	0	0	0	0	76
35 to 39	62	0	0	0	0	0	0	0	62
40 to 44	66	0	0	0	0	0	0	0	66
45 to 49	62	0	0	0	0	0	0	0	62
50 to 54	70	0	0	0	0	0	0	0	70
55 to 59	77	1	0	0	0	0	0	0	78
60 to 64	89	0	0	0	0	0	0	0	89
65 & Up	42	0	1	0	0	0	0	0	43
Total	699	1	1	0	0	0	0	0	701
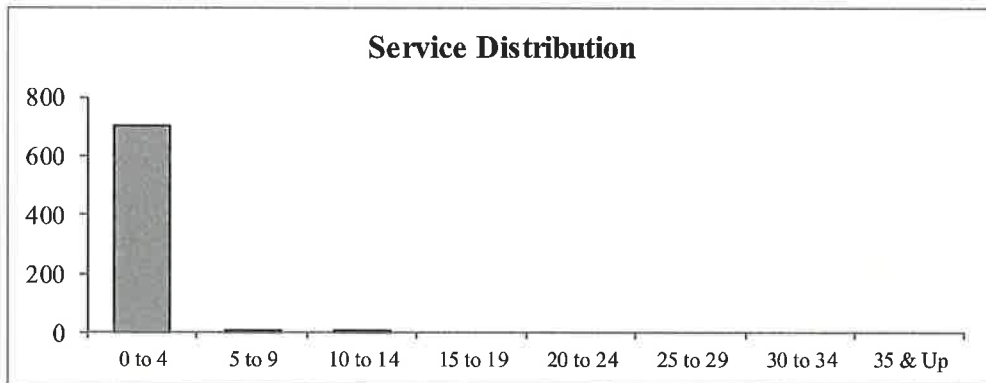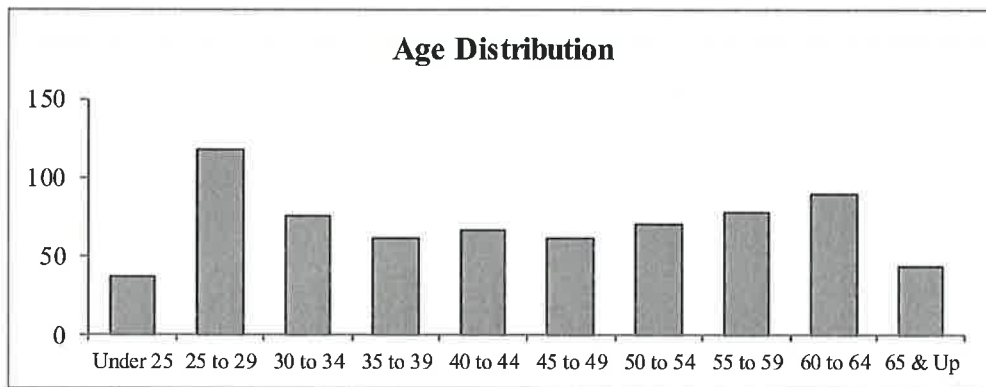
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
DISTRIBUTION OF ACTIVE MEMBERS

as of January 1, 2018

Classified - Tier 3

Age	Service								Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 & Up	
Under 25	55	0	0	0	0	0	0	0	55
25 to 29	86	0	0	0	0	0	0	0	86
30 to 34	57	0	0	0	0	0	0	0	57
35 to 39	46	0	0	0	0	0	0	0	46
40 to 44	29	0	0	0	0	0	0	0	29
45 to 49	30	0	0	0	0	0	0	0	30
50 to 54	25	0	0	0	0	0	0	0	25
55 to 59	32	0	0	0	0	0	0	0	32
60 to 64	37	0	0	0	0	0	0	0	37
65 & Up	10	0	0	0	0	0	0	0	10
Total	407	0	0	0	0	0	0	0	407
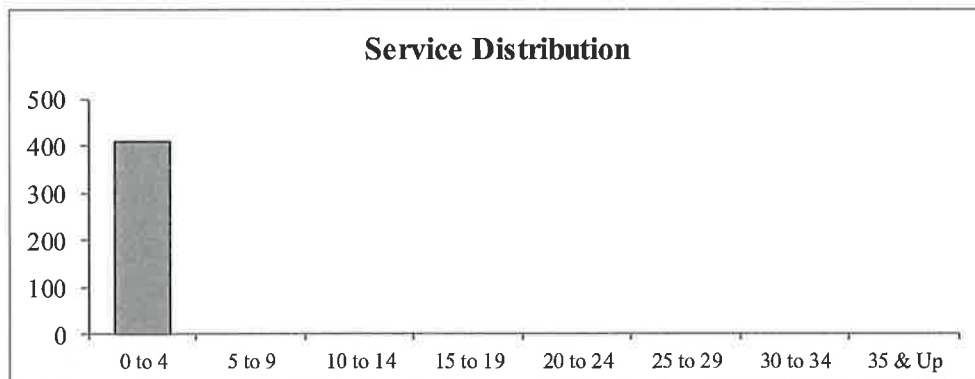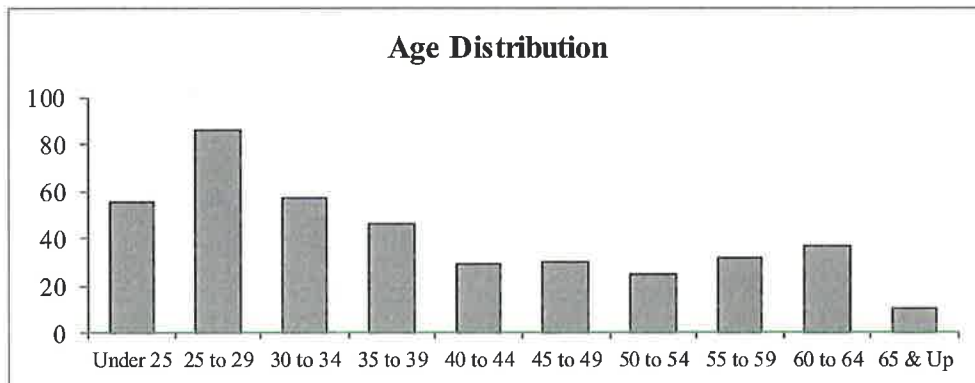
Age Distribution

Service Distribution

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF ACTIVE MEMBERS

as of January 1, 2018

Total

Age	Number			Salaries		
	Males	Females	Total	Males	Females	Total
Under 25	36	193	229	$ 1,330,822	$ 6,289,299	$ 7,620,121
25 to 29	179	696	875	6,711,847	26,821,440	33,533,287
30 to 34	219	676	895	9,293,484	28,989,628	38,283,112
35 to 39	265	728	993	13,927,949	35,413,221	49,341,170
40 to 44	225	626	851	12,771,777	31,775,049	44,546,826
45 to 49	223	678	901	13,401,976	34,128,687	47,530,663
50 to 54	219	632	851	11,660,879	31,203,446	42,864,325
55 to 59	220	643	863	11,839,728	28,420,330	40,260,058
60 to 64	225	518	743	10,052,307	20,693,603	30,745,910
65 & Up	136	232	368	5,920,447	9,292,498	15,212,945
Total	1,947	5,622	7,569	$ 96,911,216	$ 253,027,201	$ 349,938,417
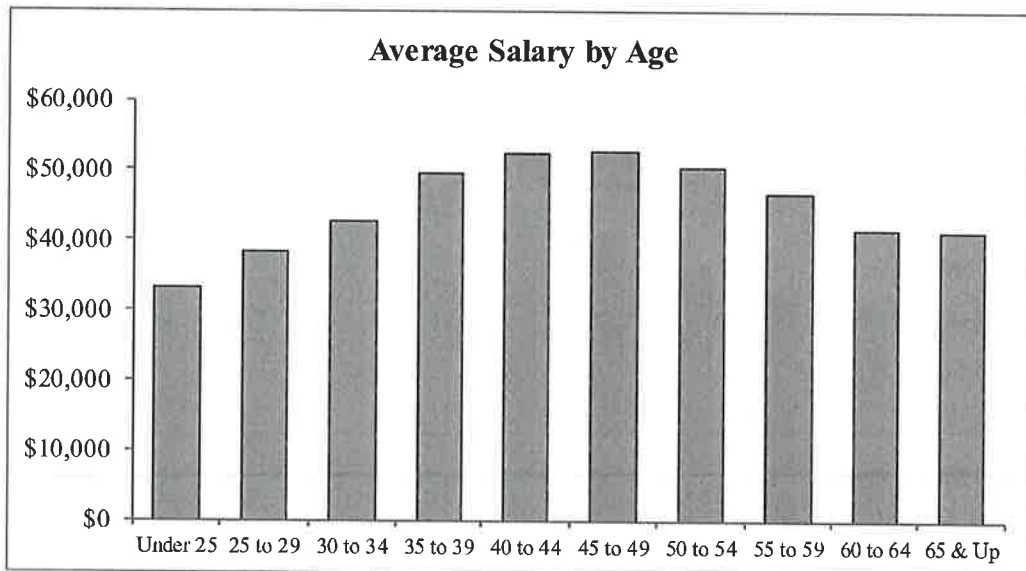
Average Salary by Age

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF ACTIVE MEMBERS

as of January 1, 2018

Certificated

Age	Number				Salaries		
	Males	Females	Total		Males	Females	Total
Under 25	19	118	137		$ 792,607	$ 4,969,342	$ 5,761,949
25 to 29	118	532	650		5,178,743	23,702,711	28,881,454
30 to 34	147	525	672		7,045,897	25,884,905	32,930,802
35 to 39	210	591	801		12,032,802	32,435,109	44,467,911
40 to 44	172	485	657		10,902,524	28,570,432	39,472,956
45 to 49	157	478	635		10,740,396	29,383,929	40,124,325
50 to 54	100	404	504		6,615,961	25,941,137	32,557,098
55 to 59	90	320	410		6,012,824	20,483,126	26,495,950
60 to 64	68	216	284		4,091,831	13,535,271	17,627,102
65 & Up	41	81	122		2,990,509	5,471,919	8,462,428
Total	1,122	3,750	4,872		$ 66,404,094	$ 210,377,881	$ 276,781,975
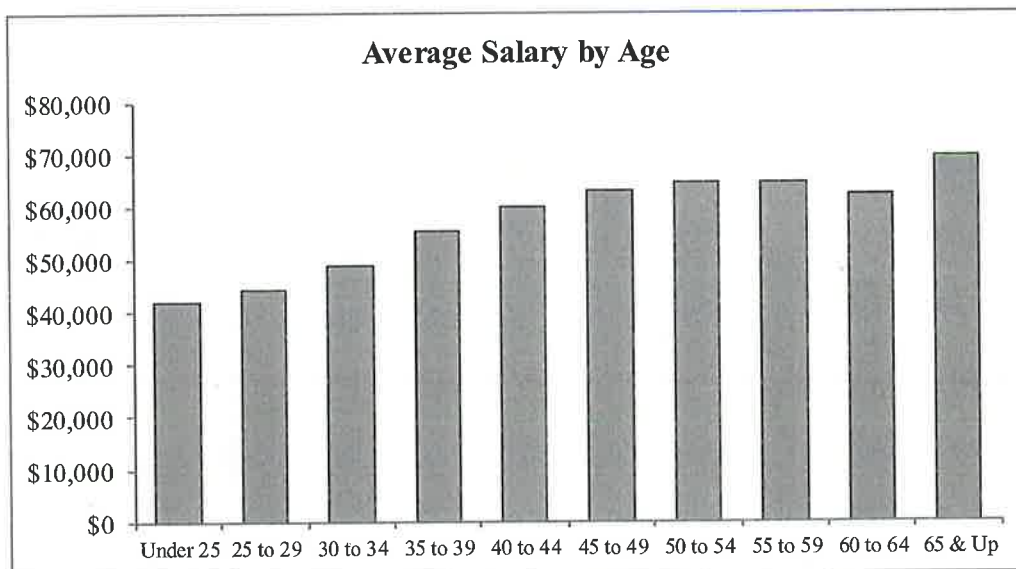
Average Salary by Age

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF ACTIVE MEMBERS

as of January 1, 2018

Classified

Age	Number			Salaries		
	Males	Females	Total	Males	Females	Total
Under 25	17	75	92	$ 538,215	$ 1,319,957	$ 1,858,172
25 to 29	61	164	225	1,533,104	3,118,729	4,651,833
30 to 34	72	151	223	2,247,587	3,104,723	5,352,310
35 to 39	55	137	192	1,895,147	2,978,112	4,873,259
40 to 44	53	141	194	1,869,253	3,204,617	5,073,870
45 to 49	66	200	266	2,661,580	4,744,758	7,406,338
50 to 54	119	228	347	5,044,918	5,262,309	10,307,227
55 to 59	130	323	453	5,826,904	7,937,204	13,764,108
60 to 64	157	302	459	5,960,476	7,158,332	13,118,808
65 & Up	95	151	246	2,929,938	3,820,579	6,750,517
Total	825	1,872	2,697	$ 30,507,122	$ 42,649,320	$ 73,156,442

Average Salary by Age

OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF DEFERRED VESTED MEMBERS

as of January 1, 2018

	Number			Monthly Benefit at Unreduced Retirement		
Age	Males	Females	Total	Males	Females	Total
Under 25	0	0	0	$ 0	$ 0	$ 0
25 to 29	5	5	10	1,935	1,622	3,557
30 to 34	25	95	120	11,027	44,560	55,587
35 to 39	49	163	212	29,819	99,760	129,579
40 to 44	35	136	171	28,210	94,227	122,437
45 to 49	27	119	146	20,170	71,214	91,384
50 to 54	39	111	150	38,432	69,189	107,621
55 to 59	14	101	115	13,061	63,458	76,519
60 to 64	14	77	91	7,084	33,917	41,001
65 & Up	4	24	28	1,750	8,323	10,073
Total	212	831	1,043	$ 151,488	$ 486,270	$ 637,758

Age Distribution
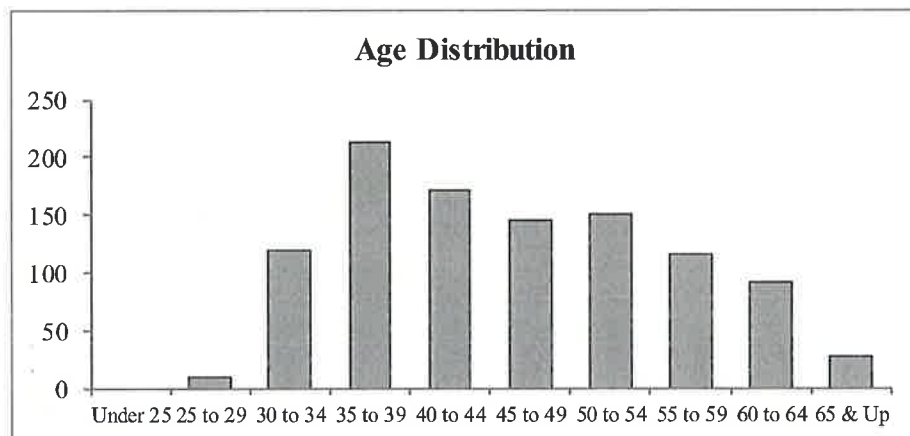
OMAHA SCHOOL EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF RETIREES, BENEFICIARIES AND DISABLED MEMBERS

as of January 1, 2018

Age	Number			Total Monthly Benefit		
	Males	Females	Total	Males	Females	Total
Under 55	4	13	17	$ 1,606	$ 13,621	$ 15,227
55 to 59	51	158	209	116,906	419,487	536,393
60 to 64	139	414	553	348,320	1,094,697	1,443,017
65 to 69	302	879	1,181	789,407	1,880,918	2,670,325
70 to 74	341	734	1,075	816,586	1,576,096	2,392,682
75 to 79	224	517	741	512,971	916,581	1,429,552
80 to 84	146	334	480	330,913	565,822	896,735
85 to 89	60	194	254	120,937	294,512	415,449
90 to 94	25	101	126	57,106	143,841	200,947
95 & Up	7	35	42	13,930	64,786	78,716
Total	1,299	3,379	4,678	$3,108,682	$6,970,361	$10,079,043

Age Distribution

Average Benefit
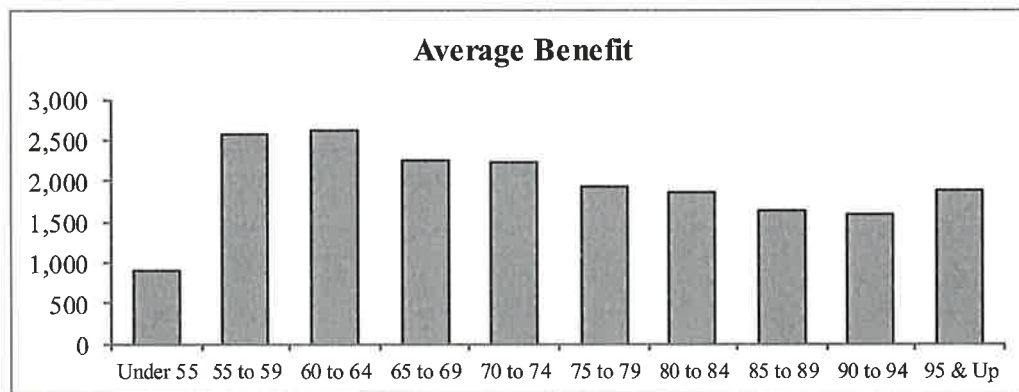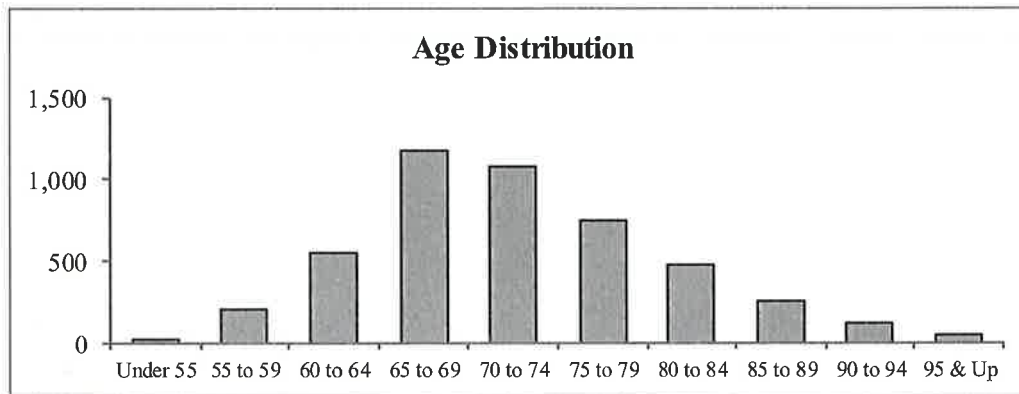
Appendix H

December 3, 2018
Retirement Committee
Hearing Transcript

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KOLTERMAN: [00:59:40] So the next thing up is Metro, Curt Simon, if he'd like to come forward and speak please. This hearing is to talk about the 2018 underfunded plan plans. We will have seven different plans that will be-- eight actually that will be discussed briefly this afternoon. We're going to start just in the essence of time, so Curt spell your name and thank you for your report.

CURT SIMON: [01:00:19] Thank you. Curt Simon, C-u-r-t S-i-m-o-n, I'm the executive director at Metro Transit, 2222 Cuming Street, Omaha, Nebraska 68102. And I wanted, if I could, to explain some of the variances in our LB759 report. I thought that might be the easiest way to proceed and some positive steps that have occurred between the last time I was here and today. So if you note on item 1a, funding status improved by six points between last year and this year. That's in large part because of a fairly robust return on investment that you see in 1c of 13.35 percent. However, it also is a result of changes in contributions by both the employer and the employee during the same one-year period of time where the employer moved their percentage from 6.5 percent to 7.5 percent and the employees move there from 6 percent to 7 percent. You might note that those returns also occurred-- if you look at item 1b, we've been very-- what we think is very conservative as it pertains to our assumed return of investment. You'll note that in 2013 it was 7.5 percent and we've reduced it throughout several years up until 2018 where we're assuming a 6.75 percent return on investment, which we think is much more conservative. It's a fairly mature plan that we have there. Other notable changes to the plan that occurred during the last year appear on item 6 on the second page. Most notably, we change the plan document to indicate that full retirement age would be at such time as that employee reached full retirement for the purposes of receiving Social Security. Prior to that it was age 65 was considered for retirement. We also tiered the plan for employees. Effective August 31, 2017, we tiered it based upon years of service as opposed to straight out 1.4 percent benefit formula that it was heretofore. In addition to that, we contributed a-- the company contributed 1 percent of wages lump sum to the plan in 2016 in order to bolster the plan. The current collective bargaining agreement runs through 2019, at which time we'll be looking at what

the results are. We're on a calendar year as it pertains to our actuarial being done, so our next actuarial will be January 1, 2019. So we'll be looking at that very seriously to see what we need to do with working with our bargaining unit to continue to keep this in line. We're pretty confident that we're making the right positive moves together to get there. Are there any questions?

KOLTERMAN: [01:03:01] Just a general comment. If you keep this up you won't have to be back next year maybe.

CURT SIMON: [01:03:10] Well, I do love coming down and seeing you but--

KOLTERMAN: [01:03:16] I don't have any questions. Does anybody have any questions?

CURT SIMON: [01:03:19] Thank you.

KOLTERMAN: [01:03:20] I appreciate your time. Thank you.

CURT SIMON: [01:03:21] Thank you.

KOLTERMAN: [01:03:26] Okay, next we have Dr. Logan and Dave Kramer, OPS on behalf of OSERS.

CHERYL LOGAN: [01:03:49] Good afternoon. Senator Kolterman and members of the Retirement Committee, my name is Cheryl Logan, C-h-e-r-y-l, Logan, L-o-g-a-n, I am superintendent of Omaha Public Schools. While I have met several of you individually, this is my first chance to testify before the legislative committee. I thank you for the opportunity. With me is David Kramer who is outside legal counsel to OPS. He has been involved with OSERS for several

years and has the technical expertise in case you have detailed questions. As you may know, I was hired by the Omaha Public Schools in January and started as superintendent on July 1. While I was still back east, through the magic of technology I was able to watch events on-line including OPS board meetings and legislative proceedings. I was very much aware of the OSERS proceedings. I was very much aware of the OSERS funding issue and watched broad debate on LB548. Of course, you will remember that LB548 would have authorized pension obligation bonds to address the shortfall. The Legislature decided against that option and we have moved on from it. Since arriving in Nebraska, OSERS has been a top priority. I have had discussions with board members about it and I can assure you that the OPS board shares my concern with OSERS funding and its serious impact on the budget. This fiscal year we paid our ARC on a timely basis on July 11. We understand that this is our obligation. We also understand that it has a significant impact on our budget. We can continue to seek ways to mitigate that impact and therefore impacting our ability to deliver service to our 53,300 students. To that end I have had the opportunity to meet with Senator Kolterman and committee legal counsel and hope to continue to work closely with this committee. OSERS does not only affect only OPS. Many others are impacted, including current teachers and noncertificated employees, our retirees, administrators, students, and OSERS trustees. My view is that any resolution to OSERS funding must involve collaboration among those impacted. To that end OPS invited various stakeholders to participate in a series of meetings hoping to arrive at consensus solutions. These meetings have included OSERS, OEA, which is Omaha Educators Association, Nebraska State Education Association, SEIU, retirees, our administrators group, and GNSA. We have engaged an outside facilitator to guide the discussions. We believe that all participants understand that this will be a difficult process which will include some very tough decisions. We also believe that all stakeholders are participating in a good faith effort to reach consensus. We have already agreed in writing that any resolution impact all constituencies equally. It is my hope that our group can find consensus agreement that will protect the interest of all stakeholders to the fullest extent possible. But most importantly served are this-- importantly the

students that all of us serve. As the process continues we will keep Senator Kolterman and this committee apprised of our progress. Thank you for the opportunity to speak today and I will be happy to answer any questions that you may have. I will defer technical questions to Mr. Kramer.

KOLTERMAN: [01:07:20] Do we have any questions? Dr. Logan, I have just a couple of questions. I guess my first question would be, you know we looked at several options a year ago and unfortunately you weren't here yet, but is that still an ongoing process? Are you still looking at other funding options other than through your PRISM work?

CHERYL LOGAN: [01:07:46] We are looking at everything. We just began our work together as a group and we've had two-- OSERS has had two separate meetings where they have brought in experts where, for example, we met with-- on-line via the magic of on-line-- on an on-line meeting we met with a Minnesota group as they worked through their issues in 2010 and 2016 to kind of learn about some of the things that they went through and how they formed a coalition and were able to keep that coalition together. One of the things that I spoke about earlier with us all signing an agreement saying that we were going to agree that we will all be impacted equally was some-- one of the things that we adopted from the work that we saw in Minnesota. Just getting everybody to the table has been a lift and hopefully moving forward we can-- I'm confident that we can keep our coalition together. I do believe that everyone there is making a good faith effort and we are starting to look at several different things that could help us with our unfunded liability.

KOLTERMAN: [01:08:59] Okay. Senator Groene, you have a question?

GROENE: [01:09:00] Thank you, Chairman. Yes. I forget what school district you came from.

CHERYL LOGAN: [01:09:06] I was in Philadelphia.

GROENE: [01:09:07] And you were the superintendent?

CHERYL LOGAN: [01:09:09] No, I was the chief academic officer.

GROENE: [01:09:11] So you weren't involved-- just looking what experience you have. What was the retirement situation where you came from? Was it troubled, too, like most?

CHERYL LOGAN: [01:09:22] In the Commonwealth of Pennsylvania?

GROENE: [01:09:23] Yes.

CHERYL LOGAN: [01:09:23] Yes, very much so. Yes.

GROENE: [01:09:25] So you've seen this before?

CHERYL LOGAN: [01:09:27] I have, yes.

GROENE: [01:09:27] And you've been involved? Have they done anything with theirs or are they just kicking the can down the road?

CHERYL LOGAN: [01:09:34] I don't believe that they're kicking the can down the road. They did several things, especially for folks who were new coming on board and changing the way that the benefits were structured. So their resolutions and the Commonwealth were much more weighted on new employees, increasing the amount that folks paid into the system. Now, there is a difference, that there's only one-- it was only one system for the entire state. Making sure that all districts made

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their payments, so adding some controls and to make sure that all districts paid into their 500

districts in the state of Pennsylvania, the Commonwealth of Pennsylvania and making sure all paid

in in a timely fashion.

GROENE: [01:10:22] Thank you.

CHERYL LOGAN: [01:10:23] You're welcome.

GROENE: [01:10:25] Senator Stinner.

STINNER: [01:10:34] Welcome.

CHERYL LOGAN: [01:10:34] Thank you, Senator Stinner.

STINNER: [01:10:34] There is-- in this report there's currently $131 million of deferred,

unrecognized investment [INAUDIBLE] by 11 percent of the market value and because of

smoothing techniques five years we need to offset that by investment gains. Any feel for where

you're at with that in terms of having to fund an additional contribution should that happen?

CHERYL LOGAN: [01:10:59] So one of the things that we are doing in our own budget is

looking at sustainability, realizing that we're going to have to make that payment. We will have--

we are working right now on our budget for 1920 [SIC]. We'll have a rough cut budget by the time

we leave for winter break, which is the 21st, that includes the ARC payment that we anticipate

making and any potential changes in our budget structure which really are our fixed costs, looking

at our fixed costs so that-- our fixed recurring costs so that we are ready to act and to adopt a budget

that will allow us to make our payment. In addition, we also are looking at our fund balance. We

have a obligation to have a fund balance between 10 and 20 percent. We are trying to make sure our fund balance never dips below 15, actually, and that would like to keep it closer to 18 percent on balance is a rainy day fund, and it rains. And so we are trying to make sure that we-- because that is another way for us to be sure that we can make a payment. For every 1 percent of fund balance represents about $6 million dollars. And so we have-- are looking at making sure that we keep that fund balance at a healthy and in a healthy position realizing that there is variability in the ARC payment based on returns.

STINNER: [01:12:32] Okay. And the fund balance is actually your cash reserve balance and you're carrying, if the computation is right, about [INAUDIBLE] to carry about a $30 million cushion in your budget. I think that's right.

CHERYL LOGAN: [01:12:47] Well, it could be as high as that, but it depends on if it's between 15 and 20. Yes that's correct.

STINNER: [01:12:52] Okay. And that should be enough to take care of this contingency should it so happen?

CHERYL LOGAN: [01:12:58] Well, it's a lot of-- because we're counting on we're factoring in what we project our state aid to be and many other things in terms of that, so there's variability in that as well. But we feel like we-- it was going to be difficult for us to maintain this payment, but we are going to structure our budget in a way that will allow us to do it to the best of our ability.

STINNER: [01:13:33] Okay. And you are highly reliant on state aid. Do you know that percentage?

CHERYL LOGAN: [01:13:38] I do not. I apologize. I did not know the percentage.

STINNER: [01:13:40] Somewhere along the line I think it's like 40 to 44 percent. What is it, Mike?

GROENE: [01:13:43] I think it's over 50, isn't it?

CHERYL LOGAN: [01:13:49] I'll find out the exact number. I'm not sure if anybody on our team knows the exact number, but I'm not sure of the exact number so I don't want to misspeak.

STINNER: [01:13:56] OK. So you are highly reliant on that. You do have a considerable amount of debt. You have this contingent liability out there. And you're trying to build a cash cushion or cash reserve that would accommodate some of these contingencies. Is that--

CHERYL LOGAN: [01:14:11] Well, we need to be prepared so that we can run our district for our students, yes.

STINNER: [01:14:15] OK. I noticed in 2017 we did-- or actually, effective July 2018 we created a new tier of the retirement or the rule of 85 from 55 to 60. Is there any other modifications that you can see that we can do that would reduce some of this?

CHERYL LOGAN: [01:14:37] Those are some of the bills, are some of the things that we're currently considering and studying. So the group that I spoke with you about a couple months ago, that would be some of the things that we'll take under consideration. One of the things that we don't want to do is become that divergent from the NPERS system. And so we have to consider any moves that we may be harmonious with the NPERS system.

STINNER: [01:15:05] OK. That's all. Thank you very much.

KOLTERMAN: [01:15:06] Senator Groene.

GROENE: [01:15:09] I mean, that's all in this new process, but have you looked at levy override vote? Wouldn't it be more reliable if you went to the people and said, we're going to go three cents and it's dedicated to this, to our problem with our retirement and then not worry about the fluctuations of state aid versus--

CHERYL LOGAN: [01:15:30] We have-- that is something that we will likely consider.

GROENE: [01:15:34] I mean, this school bond election, you could probably sell that if you made a commitment that it was-- that's where the money was going just to. Make it more reliable.

CHERYL LOGAN: [01:15:44] Thank you. Okay, thank you.

KOLTERMAN: [01:15:46] Dr. Logan, I have just a couple of questions for you. I know you-- I believe the school board, OPS, is working with the-- under the auspices of PRISM. Did you hire them to work with you to follow a model?

CHERYL LOGAN: [01:16:02] No. That sounds like OSERS. I'm not sure. I don't know if Cecilia [PHONETIC] is here.

KOLTERMAN: [01:16:05] Well, you have a working group.

CHERYL LOGAN: [01:16:08] Right.

KIOLTERMAN: [01:16:08] And then OSERS also has a sustainability working group. Is that not correct?

CHERYL LOGAN: [01:16:13] Yeah, they have a group and we have a group. Our consultant, yes, she worked-- that's the name of her company. I'm sorry. So I don't-- I didn't really associate her with the company, I just think about her. Yeah.

KOLTERMAN: [01:16:23] How are those two organizations coming together? Are you working hand-in-hand?

CHERYL LOGAN: [01:16:27] Well, the-- I will say that one of the things that we did at our last meeting with our facilitator, who works for PRISM, I'm so sorry, was to have OSERS do a presentation of the work that we-- what we learned from Minnesota. So that is the way that we have them there. They are a crucial piece of the group. I am a ex officio member of the board-- of OSERS' board, so I also attend those meetings and bring that information back to the board. And actually, those meetings are open to the public. So each of the individuals who is represented actually usually sends a representative to the OSERS workshops, that's where they're called, as well, so they're also very well aware. So SEIU, OEA, etcetera send a rep to that workshop. That rep is also usually the person who also comes as part of this collaborative group that we put together.

KOLTERMAN: [01:17:31] Okay.

CHERYL LOGAN: [01:17:31] We do recognize that-- I'm sorry.

KOLTERMAN: [01:17:33] No, go ahead.

CHERYL LOGAN: [01:17:33] I mean, we do recognize that having OSERS as a fully participating member is crucial to moving this forward.

KOLTERMAN: [01:17:40] Just a couple of other questions. Right now you make your ARC payments, and you made it in July, have you ever given any consideration to doing those on a monthly or quarterly, semiannual basis which would, in essence, help your dollar cost average into the plan, into the investments.

CHERYL LOGAN: [01:18:04] It's something that we may also consider. I have our interim CFO, chief financial officer, Ms. Courtney Bird, is looking at that and trying to make a decision on whether to make a recommendation to the Board of Ed if we should go in that direction.

KOLTERMAN: [01:18:22] And then one last question from me is, in the past couple of years there's been some interest in-- OPS has an interest in having the PERB board manage the plan or NPERS manage the plan. Do you still have an interest in that?

CHERYL LOGAN: [01:18:39] Well, the Nebraska Investment Council does the investments now. And I would say, generally, from the Board of Education there is an interest.

KOLTERMAN: [01:18:47] Okay. Thank you. Any other questions? Thank you very much.

CHERYL LOGAN: [01:18:54] Thank you. I appreciate it.

KOLTERMAN: [01:18:56] I appreciate you coming.

CHERYL LOGAN: [01:18:56] No problem.

KOLTERMAN: [01:18:57] We'll continue to dialogue.

CHERYL LOGAN: [01:18:58] I'm sure we will. Thank you.

KOLTERMAN: [01:18:59] Mr. in den Bosch, which one is this? This will be the Omaha Civilian Plan.

BERNARD in den BOSCH: [01:19:39] Possibly more information, maybe too much.

KOLTERMAN: [01:19:44] You guys killed another tree, huh? Actually, I assume you're just going to go from the Omaha Civilian right into the Omaha Police and Fire.

BERNARD in den BOSCH: [01:19:58] If that's OK.

KOLTERMAN: [01:19:59] Thank you.

BERNARD in den BOSCH: [01:20:00] Obviously, you'll tell us when you're done with one of those and one will go on with the other.

KOLTERMAN: [01:20:16] Okay. Go ahead and start off.

BERNARD in den BOSCH: [01:20:20] I'll go. Bernard in den Bosch, first name, B-e-r-n-a-r-d, last name is three words, first word, i-n, second word, d-e-n, third word, B-o-s-c-h, deputy city attorney for the city of Omaha.

PATRICE BECKHAM: [01:20:37] Patrice Beckham, P-a-t-r-i-c-e, Beckham, B-e-c-k-h-a-m, with Cavanaugh Macdonald, the retained actuary for the system.

BERNARD in den BOSCH: [01:20:45] And what I think we've decided to do is we've described the plan that we've had in place. [INAUDIBLE] and do a presentation, a walk-through of a lot of it and then if there's any questions or any additional things we'll obviously both try to help you with as many answers as we can, hopefully.

PATRICE BECKHAM: [01:21:05] Right. Glad to be back. And we kind of put a presentation together to think this may be a little more cohesive. And we won't take a lot of time. We'll try to keep this moving, because I know you have plenty of folks to listen to, but think a little bit of background is helpful. On page 2, just a reminder that the Omaha city ordinance requires essentially a 50-50 split of costs between the city and the members. The benefit provisions, including contribution rates, are negotiated in the labor contracts so they don't move automatically. The contribution rates are set until there's a new labor agreement in place. And this system includes employees that are covered by several different bargaining groups and there aren't any anticipated pension changes, I think, for '18 and beyond at this point in time. Page 3. I think given that we're talking in 2018 results it's good to sort of look back and remember the history for both this plan and the police or fire plan. The funding outlook after the Great Recession in 2008-09 was pretty grim. The plan was projected to be depleted, run out of money in about 20 years or so. So there were significant changes made to both benefit provisions and contributions at the end of 2014 beginning in 2015. Those included a lot of the similar things that were occurring across the United States for public plans' later retirement age. The benefit accrual was lower. It was two and a quarter times years of service. It was lowered to 1.9 for future years of service only. Benefits moved from a high one-year average to high five, with some phase-ins there of disability was significantly decreased.

City increased their contribution rate by 7 percent and then, pretty importantly for employees hired on or after March 1 of 2015, they are now covered by a cash balance plan which this group is familiar with that because Nebraska has a cash balance plan for both state and county employees. It's sharing the preretirement investment risk directly with the employees, because there is a guaranteed interest credit of 4 percent but the additional what we call dividend, additional credit, interest credit, is based on actual returns, not assumed. So if actual returns are lower, essentially account balances are lower, benefits are lower.

BERNARD in den BOSCH: [01:23:49] And, ironically, in approximately the three years we've had a cash balance plan we've had approximately a 29 percent turnover in employees. So roughly 29 percent of our employees are actually now in the cash balance plan.

PATRICE BECKHAM: [01:24:00] Page 4, just a little bit again historical or background information on the funded ratio, the funded status. You can see in 2009 about 63 percent funded. And, you know, the sharp drop is, again, asset smoothing. We're recognizing the investment return in 2008 over this period. You can see kind of a bounce back in 2015. That was a result of the changes, the benefit changes in the labor contracts that decrease the actuarial accrued liability. And then there's a decrease in 2018. We'll talk about a little bit more detail; it's due to assumption changes. Page 5, just comparing the blue bars of the actuarial required contribution, and the red line is the actual employer contribution. And you can see for a period from 2009 through 2015 there was less money actually going in than what was actuarially needed to move the plan towards full funding on the schedule that was in place. The last couple of years there's actually been a little more coming in on the actual contributions than the actuarial rate, so that's a significant change. On page 6 we talked earlier about the normal cost rate, how much needs to be paid each year to cover the benefits for active members. So what this is showing you very clearly is that the changes in 2015 lowered the costs of this plan from about 14 to 10 percent of pay. So that's a significant change in

the value of the benefits. And we don't get all of that immediately, okay, because this is the ongoing costs for actives. But when the same percent of payroll is coming in if we only need 10 percent to fund the benefits for current people we'd have more money to pay off the unfunded liability. And over time, as more and more people are in the lower cost plan we have additional dollars to help fund the unfunded liability. So moving to the 2018 valuation, according to state statute an experience study was performed in 2017, results presented to the board in 2018. The board did take action, adopted all of the recommended assumptions. Most significantly, there was a reduction in the inflation assumption from 3.25 to 2.5. That's a pretty big change in one movement. That impacted the other economic assumptions. Most importantly, investment return assumption was reduced from 8 percent to 7.5. We had to sort of weigh wages in the general economy move. That's part of the individual salary increase assumption. That was lowered from 4 to 3.10. And then payroll growth, again, how covered payroll in aggregate will increase over time was reduced from 4 to 3. And, again, now we see with a cash balance plan if we assume the returns are going to be lower, we assume the interest crediting rate will be lower as well. That's that kind of risk sharing. We also adopted the most recent mortality table RP-2014 and use a one-year setback for females. So a 65-year-old female is assumed to exhibit the mortality of 64, better than the table, and that did have a pretty significant impact for the system's funding as well. On page 8 you can see the 2018 valuation results. If we had used the old assumptions, those being the set of assumptions used in the 2017 valuation, compared to the new assumptions which were what the board adopted. Again, you can see the increase in actuarial liability was $27.5 million flows straight through to the unfunded liability, so it would have been about $196 million, but instead it's $223 million. And that's simply due to the change in the assumptions. The funded ratio decline would have been 56 percent, decline of 53, and then the very bottom line, the very last row of this table, the contribution margin this year would have been 1.65 percent and instead there is a contribution shortfall of 2.21 percent. So the change in assumptions impacted the contribution rate by almost 3.9 percent of pay, a very, very significant change. We make those changes because we think that's a better estimate of what the

future holds. We can't control what the market-- rate of return on market is or how long people are going to live. All we're trying to do is come up with the best estimate of the future that we can gather at this point in time. Page 9, you can kind of see the last three valuations. Again, 2018 is going to look worse than it really was because of the assumption change. It looks like the unfunded liability went up from 2017; it actually would have gone down except for the assumption change. But we've-- actually, I think-- the way I like to look at it is we've improved the probability of meeting our assumptions and therefore have kind of a better track to expect it to follow those projections going forward.

KOLTERMAN: [01:29:51] Doesn't that also take into effect the change in mortality?

PATRICE BECKHAM: [01:29:55] Yes. All assumptions, yes, exactly. And then you can see in the '16, '17 valuations again we had a contribution margin. This year we've got a shortfall. Membership information on page 10. Really, the important piece of information here is the very first line, active members. In the '18 valuation we had 1,222. Look to the far right, under 2015 you can see we only had 1,143 at that point in time. As there are more members, it has a positive impact on the funding because we're collecting a fixed contribution rate. More people, more payroll, more dollars helps fund their unfunded liability more quickly. Page 11, kind of comes back to Mr. in den Bosch's comment about the cash balance plan. The red bars are members in the cash balance plan. The blue bars are those in the legacy, the final pay plan. We're up to 27 percent of the active membership in the '18 valuation is in the cash balance plan. That's important because that liability will grow more slowly and we'll react to actual experiences, different than expected, in a more favorable way than the final pay plan. But no doubt about it, most the liability is still with the legacy plan. Page 12 is a comparison of market and actuarial. We did sort of flip, January 1 of '17 actuarial was higher than market deferred losses. January '18 now market is higher than actuarial by $3 million. You can see the return on market was almost 13 percent for 2017, on an actuarial

smooth basis was 8.5. So we did have a gain on assets. And then the next page is just a glimpse of the actual liability by group. And the thing I like about this chart is it makes it very clear there's a lot of liability for inactive members, which essentially can't change. So it's the blue part of the pie is people who are currently receiving benefits, including the red pieces for disabled members and the yellow for those who are active, entitled to a benefit in the future. So, really, we've got about 25 percent of the pie for active members, which is when we went through the benefit changes and reform in 2014 really only got 25 percent of the pie that you can modify at all to impact the funding. And that's why it's very hard to move funding from 55 percent to 80 percent in one fell swoop. It just can't happen absent a really large influx of money. Page 14, change in the unfunded liability. The only thing I want to point out on this page, again, the assumption change under 2017, $27 million. You won't see any other numbers on any of these years anywhere close to that. That was a very, very significant [INAUDIBLE] for the retirement system. Page 15. A little bit more detail on the pieces of the contribution. You can see ongoing it costs about 10 percent of pay to pay for current actives and 21 percent of pay to pay off the system's unfunded liability. And that's really the challenge.

BERNARD in den BOSCH: [01:33:39] And I'll just hit on one thing here. The first point that was made in the presentation is, is that the city and the employees' contributions are to be roughly equal. When the changes were made in 2014 to go into effect in 2015, the employees made their contribution by reduction in benefits and the city made theirs by an increase in cash. That's why you see the disparity, but there was an actuarial amount placed on that reduction in benefits to ensure that the employees and the city were both contributing similar or the same amount or to try to help the, obviously, the huge problem that existed, the tremendous problem that existed.

PATRICE BECKHAM: [01:34:23] Great point. And just to clarify, just because there's a contribution shortfall because the money that's coming in right now in this year is less than the

actuarial rate doesn't mean that the system will never be fully funded. We are a lot of moving parts here and the only way we really get insight into that is do a projection similar to what we-- what I showed you for the state's three retirement systems earlier. And I'm going to in the interest of time just ask you to move to page 18. Again, this is assuming all assumptions are met and actually nothing else changes. There's no change in the benefit structure, there's no change in the number of active members. And so what we see is that by 2048, so in 30 years, the system gets to 100 percent funding. So it doesn't-- it's a shortfall because it isn't going to hit its targeted full funding date, but the money keeps coming in and eventually it gets to 100 percent funding. It is worth noting though that, you know, it's about 2034, 2035 before the funded ratio is above 60 percent. So kind of treading water here for a little bit and then as, again, more and more people are in the cash balance plan and that cost goes down, we have more money to throw to pay off our debt. We're kind of reversing that and then would, you know, I think pretty rapidly move from 60 to 80 in about 10 years. So while some might look at this and think it doesn't look that good, I would just remind the committee that in 2009 that was projected to be depleted about 2029. This is, you know, far-- a great improvement compared to that. So we need to think keep in mind where this system has been and the challenges with everything being negotiated. Any questions?

KOLTERMAN: [01:36:30] Senator.

STINNER: [01:36:30] I'm going to referred to page 11, which is active members and then cash balance versus final pay chart. If I understand this right, it's grown at about a 9 percent clip of people coming in or the turnover rate is around 9 percent. Not all of that 9 percent I know is going to be retirement-age people. Tell me what that demographic looks like, that 9 percent that's turning over. And it looks like maybe a hundred people or better per year. Are 50 percent of those taking away retirement benefits or are they early folks that just leave because there's opportunities of some other place that won't be in your--

BERNARD in den BOSCH: [01:37:27] I think you're probably right because I think historically you would expect that number to be 90 percent or something. I think you're finding probably turnover in a greater ratio of people that are leaving early. Obviously, the economy is strong. There's opportunities for other jobs so we do see some people leaving because they get--

STINNER: [01:37:46] And you cut your benefits.

BERNARD in den BOSCH: [01:37:47] And we've certainly reduced our-- not only our pension benefits and our pension. Ten percent right out of the top makes it difficult for employees who are making $15 or $16 an hour, which is what a significant percentage of the people in the civilian system are here. Blue collar workers who aren't necessarily making a lot, so a lot of those folks have a tendency to leave or pursue other opportunities. So I think you're 50 percent number is probably fairly accurate.

STINNER: [01:38:20] So it-- actually in two years you'd be at 45 percent if you continue to go at 9. So half of it's there. How does that-- how do you figure that into your calculation?

PATRICE BECKHAM: [01:38:31] It's amazing what computers can do.

STINNER: [01:38:34] I'm saying, shouldn't you narrow that gap a little quicker?

PATRICE BECKHAM: [01:38:37] Well, these projections-- well, not this one, but the one that you've looked at at the end had all the actuarial assumptions are met. And we have assumptions that people will leave before they're retirement eligible. We have assumptions that once they're eligible how many are going to leave and when and all that plays out. And when those bodies leave, the

model brings in new people. And the new people are in the cash balance plans. So we actually, through the modeling we could go through and get sort of a breakdown each year of what the future populations look like. It's a little deceiving in the first few years because it's going to grow faster and then it's going to kind of slow down because some of these people are going to leave; current cash balance people leave and be replaced by people in the cash balance plan.

STINNER: [01:39:25] Right.

PATRICE BECKHAM: [01:39:25] Because your highest turnover is probably your first five years. But it-- over time we could actually model out if that's something you want to see next year.

STINNER: [01:39:32] I don't. I'm just trying to figure out--

_____: [01:39:35] I'd like to see it.

PATRICE BECKHAM: [01:39:35] Yeah, you might want to see it.

STINNER: [01:39:35] If we have included this, I mean, it looks like, like I said, in two years 50 percent of your whole squad that's working is going to be covered on your cash balance which should relieve some of the pressure from and actually close that gap, that funding gap quicker. But you say you have put that into your assumptions?

PATRICE BECKHAM: [01:39:58] Yeah, it's in the very last page, those numbers that you saw, it is in there.

STINNER: [01:40:04] OK.

PATRICE BECKHAM: [01:40:05] I do think it's going to slow down a little bit because, you know, in your first year every single person that leaves goes into the cash balance plan. But think about ten years from now a lot of those people--

STINNER: [01:40:16] You do a lookback every year anyway and change--

PATRICE BECKHAM: [01:40:18] We capture everything that happens every year. And we have had a little bit of a growth in the number of active members, but even when half of the active population is in the cash balance plan, most of the liability is in the old plan because those are the people close to retirement.

STINNER: [01:40:35] I get that. Right.

PATRICE BECKHAM: [01:40:37] Or who have already retired.

KOLTERMAN: [01:40:39] Senator Groene, do you have a question?

GROENE: [01:40:41] Yes, Chairman. On page 10 you've got active members. The membership information is that on the defined benefit plan or the cash balance or combined?

PATRICE BECKHAM: [01:40:53] Combined.

GROENE: [01:40:53] So the money is blended?

PATRICE BECKHAM: [01:40:54] Yes, it's one plan. Do you want to answer instead of me? It's

one plan with two benefit structures. So just like, if you think about your school retirement system--

GROENE: [01:41:02] Tiers.

PATRICE BECKHAM: [01:41:02] -- you have tiers. This is a tier, it's just the second tier is the cash balance plan. It's still a defined benefit plan.

GROENE: [01:41:11] And the payroll deduction is the same for both members?

PATRICE BECKHAM: [01:41:14] Yes.

GROENE: [01:41:15] So the new members are having to fund the old retirees is what you're saying.

BERNARD in den BOSCH: [01:41:22] The combination of the new members and the city contribution, because obviously you have-- the benefit the employee is getting is still greater than what they're putting in. But I would say that certainly the percentage of the city's contribution or whatever, there's more of the money putting in this is funding the old.

GROENE: [01:41:44] So you'd get more people on the cash balance, it costs you less, the city less payment. But what you're saying is, as you get more of those you're still going to budget the same amount you did. And that extra money is going to go basically to an ARC. And that's how you're going to catch up? Is that what you're saying?

PATRICE BECKHAM: [01:42:06] Yeah, to pay the unfunded liability. Right.

Nebraska Retirement Systems Committee December 3, 2018

Rough Draft

KOLTERMAN: [00:00:02] I'd like to welcome all of you. Senator Groene said he'd be joining us. It's a pleasure for me to have this hearing today. My name is Senator Mark Kolterman. I represent the 24th District, which is Seward, York, and Polk Counties. To my immediate left over here is--

LINDSTROM: [00:00:19] Brett Lindstrom, District 18, northwest Omaha.

STINNER: [00:00:23] John Stinner, District 48, all of Scotts Bluff County.

KOLOWSKI: [00:00:24] Rick Kolowski, District 31, southwest Omaha.

KOLTERMAN: [00:00:30] We have our legal counsel, Kate Allen, to my immediate left and then Katie Quintero has been our clerk for three years, to the far left. We also have with us Greg Tracey. He's from Omaha. He's going to University of Nebraska at Lincoln, he's majoring in economics and he'll be a good hire one of these days. I would like to ask you to turn off your cell phones. If you're going to testify, please come forward and be ready to go. And then fill out the blue sign-in sheets. When you get up here to testify state your name and spell your name. If you have handouts we need them for-- we need eight copies. If you don't want to testify and just submit a letter, you can fill out the white sign-in sheets and do that as well. Joining us is a-- I'll let him introduce himself.

GROENE: [00:01:37] Senator Mike Groene, District 42. Senator Kolterman eats faster than I do. We were in the line at the same time.

KOLTERMAN: [00:01:49] The 1:30 hearing is going to be the presentation of valuation reports

on the defined benefit plans. At this time I'd like the testifiers to come forward. Welcome.

PATRICE BECKHAM: [00:02:17] Thank you, Senator Kolterman, members of the committee. Patrice Beckham, P-A-T-R-I-C-E B-E-C-K-H-A-M, with Cavanaugh Macdonald Consulting out of Omaha. We're the retained actuary for the state retirement system. And it's my pleasure to be with you today to share the results of the July 1, 2018, actuarial valuations. I believe you all have a bound presentation. It's going to be a lot shorter so we'll go through that rather than through the actual reports themselves. As always, please feel free to ask any questions you have as we go through the material. I'm happy to stop and take questions and resolve those as they arise. So page 2. When we look at the valuation results we always end up looking back to the prior results and seeing how we went from the results in the 2017 valuation to the 2018 valuation, so it's important to note if there are changes. There were no changes to actuarial assumptions or methods this year. The same set of assumptions were used in both the '17 and the '18 valuation. We did have a legislative change LB415 from the 2017 session grants the PERB, the board, the authority to set the actuarial assumptions for optional forms of payments for members hired after July 1, 2017. So if someone decides to take a joint and survivor form of payment as opposed to a five-year certain in life, there's factors that are developed based on the mortality and investment return assumption and the PERB now sets those. We really don't have a lot of members in that tier, hired after July 1, '17, and we don't use a specific assumption at this point as to what form of payment members will elect. So it really virtually adds no cost impact on these results. The other change in LB415 was for the school system and that modified rule of 85. In the past there had been a minimum age of 55 to be eligible for a rule of 85 and that moved to age 60 for members hired on or after July 1, 2018. Obviously, there are no members in that tier in this valuation, but when we look at the projections you should realize we do have that reflected in the projections. So that's a little bit of a lower ongoing cost because people have to wait a little bit later in order to retire under that tier. Page 3. Every year we do an actuarial valuation. We capture what's actually happened, both the asset side of the equation

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and the liability side, liabilities being, you know, what's happening to the membership. So this year the return for fiscal year '18 on a market value is 8.6 percent. You might remember our assumed expected rate of return of 7.5 percent, so that was favorable. We use a smoothing method so we don't recognize all of that experience in one fell swoop. So in addition to FY '18 we have four other years that were reflecting part of that experience. All of that rolled together created an actuarial gain on the smooth or actuarial value so we had a gain. That means the value was higher than expected. And on the liability side we also had a gain. The liability side you get a gain when your liabilities are lower than anticipated and that was generally from salary increases that were lower, lower than expected. So this is actually a good year, an easier year to report. When you have gains on assets and gains on liabilities, everything's working in the right direction. So you'll see a consistent theme across all three plans where the unfunded liability is declining, is decreasing, and that's favorable. Page 4. Just a reminder about the actuarial valuation. These plans are very long-term obligations. The expected benefit payments for current members project down almost a hundred years. But we can't just put it on autopilot and let it go. So we monitor it every year the same point in time and look at certain key metrics and then recalibrate what's needed on the contribution side to sort of balance that equation and ensure that there'll be sufficient assets accumulated to pay the benefits to members when they retire. So we're measuring assets and liabilities at a point in time; that point being July 1. We stop everything on that date, we capture all the member data, that member data then drives the calculation of liabilities. And we also capture the asset values on that date and use that. We don't know exactly what the benefit payments will be in the future, so we're using actuarial assumptions to come up with a best estimate. You remember when we change the assumptions, that can have a pretty dramatic impact on the value of the liabilities. We're using what we believe is sort of our best estimate. There could be other sets of assumptions that are certainly reasonable that would produce different liability measurements. Once we calculate the difference between the liabilities and the assets we have a funding mechanism or budget policy that's actually in statute that we follow that helps us calculate the actuarial contribution rate. And that's really what's driving the

funding for the the plan year that's ending June 30, 2019. Any additional state contributions are generally made July 1 of '19 so it falls in fiscal year 2020. The valuation also helps us look back over the last 12 months and compare that actual experience to what the assumptions anticipated. And if we track that from year to year sometimes we'll get a heads up on whether it's recurring losses on mortality might be indicating when I need to make an assumption. The same if there's recurring gains on salaries. When it gets to the next experience study we'll be looking at that. And then we're always trying to look to see if there are any trends or even forward-looking things that we should be anticipating or trying to get out in front of. Page 5. I know you've heard this from us year after year but just a reminder. Again, we're not using market value of assets in our calculations. The valuation uses what's called an asset valuation method that helps smooth out the fluctuations in the market value of assets. That creates more stability in both the funded status of the plan and the contribution rates. It's very common in public plans to use a smoothing method. There are actuarial standards of practice that prevent that methodology from being used to create a funding pattern that might be desirable by the plan sponsor but not responsible. And the method that Nebraska uses is the most common method and the five-year period is the most commonly used. That means at any point in time the actuarial value may be higher or lower than market value. If the actuarial value is higher than market you'll hear us talk about deferred investment loss. It means we haven't recognized all of the investment experience that is below the assumption at that point time and vice versa. If the actuarial value is less than market we will talk about having deferred investment gains and they're just deferred. There's no magic here. They will work through the calculation in future years. So, for example, on page 6, the smoothing method that we're using is that we calculate the dollar amount of the difference between the actual return and the expected return. The expected would have been using 7.5 percent on the market value of assets and whatever that difference is, we recognize it equally over five years. So if there was a $500 million gain we recognize $100 million each year; $100 in the current year, $100 each the next four years. Using that methodology we have again deferred gains and losses that will be recognized in the next four years. And you can see the

amounts. The green ones are obviously gains the red ones that are decreasing our losses. And if you add those up we've got about $91 million deferred gain and it has not been recognized yet. But, again, it will in the future and when you look at projections those numbers are flowing through. All right. On page 7, this is the information for the school system and it's representative for all of the retirement systems. And again the black line is the assumed rate of return, which was 8 percent for most of the years until it was changed to 7.5 in the 2017 valuation. The blue line, the kind of the triangles, that's the return on market value. And the red line is the return on the smooth or actuarial value. So you can see that the red line is far smoother than the blue line and that's exactly what we're trying to accomplish. OK. It's just a timing because the market tends to be up and down over a five-year period and that provides some smoothing. All right. So we're going to look at the Judges Retirement System and Patrol and then School. And we'll spend a little bit more time on judges on a couple of definitions, so to speak, or kind of conceptual ideas and then we'll move quickly through the other two. But you'll hear probably a lot of expert lingo throughout the afternoon so I want to make sure to try to put it in context for you. Page 9. You have the results kind of summarized for the Judges Retirement System. The first line is the unfunded actuarial accrued liability. Again, the funding policy is in statute, the methodology that we're using the budget to pay or finance these benefits says we're going to contribute a level percent of payroll from the time employees are hired and come into the system until the time they leave. And on that basis we know who is in the system, we know when they were hired, we know what their salary is. And that allows us to calculate an amount that at least theoretically should be in the trust fund based on all the years of service that that person has worked. That's the actuarial accrued liability. We calculate that for each person and we sum it up for everybody. And that is according to the financing plan ideally where the plan's assets should be. Rarely are exactly there. There's usually a difference. And if the assets are less than the actual accrued liability we have an unfunded accrued liability. Sometimes the asset value is higher than the actuarial accrued liability and then we generally say we have surplus. So in this case there is a shortfall. The actuarial value of assets is lower than the actuarial accrued liability. Excuse

me. But you can see that that difference has declined. So in the 2017 valuation it's about $11.9 million and then the 2018 valuation is down to $7.6 million. Again, the funded actuarial accrued liability is impacted by both the asset and the liability experience. So we had gains on both of those that helped decrease that. When we look at the funded ratio, that's the assets divided by the actuarial accrued liability. Same information, but looking at it in a different way. So you can see where 94 percent funded in 2017, 96 percent 2018. Our target, our goal is to get 100 percent. So, again, statutes set out the mechanism of calculating the actuarial contribution rate. And we follow that in our calculations. There's kind of two parts to that. One is we have to develop a contribution for people who are actively working to put money in this year to help finance the benefits that they'll ultimately receive. And then because we have an unfunded actuarial accrued liability we need another payment-- part of a payment to finance that unfunded liability amount. Those two together this year are 26.7 percent, down from 27.92 in the '17 valuation. We have-- members are contributing as part of the funding of the plan. Those contributions vary by sort of tiers of membership and they drop when a judge hits 20 years of service. So the 7.62 is a blended rate taking kind of all that into account, down a little bit from last year. But the nonmember actuarial contribution rate this year is just over 19 percent of pay; last year was just over 20, so it's down about 1 percent. We look at the projected pay for actives and that gives us the dollar amount we need that has to come from the funding mechanism other than the members. Okay? So, again, this year the rate is down. And so we're at about $4.6 million. The expected court fees for the current year are the actual court fees from the prior year. And we've had discussions looking for ways for better estimates and have had no luck coming up with a reliable way to estimate court fees. Much more complicated I think than it sounds. So that's been the standard. So we're using the $4.1 million. And on that basis the additional required state contribution would be $443,000, again, down from about $673,000 last year. So you're seeing the results of the favorable experience this year. Any questions on that page? All right. So page 10. It's kind of a short-term outlook looking at kind of projected contributions over the next five years. We're using a model that we developed in

conjunction with the valuation. And it's based on of course lots of assumptions that drive these results. But one of the key assumptions is what's going to happen with the asset return? And so we're assuming that we're going to earn 7.5, which is our expected rate of return every year for the next five years. If that happens, this is kind of what the trend line looks like for the additional state contributions. Now remember, this is holding court fees at their current level, for lack of a better estimate. To the extent the court fees are changing it directly impacts additional state contribution. So this one is a not real reliable metric, but it's still helpful I think to see how that moves over time. So we're recognizing that deferred investment experience over the next four years and holding court fees level. And we do know generally our payroll is increasing. Okay? So every-- all of our calculations are based on level percent of payroll. So dollars of payroll increase, dollars of contributions will increase, even if all assumptions are met. So you get a little bit of squeezing on the additional state piece and you can see it kind of goes up and then it comes down a little bit and it starts going down. Again, this one's a little harder because the court fees are just really hard to anticipate. But it's I think at least helpful for you to see. I mean, the story is if you're going to plan our budget, plan on there being an additional state contribution.

KOLTERMAN: [00:20:00] I have a question about that. If you look at page 9, last year we had expected court fees were a little bit less than they are this year. So did you use that amount last year going forward back in your estimate?

PATRICE BECKHAM: [00:20:20] If I remember right, I think we had a change in the court fees in '17.

KOLTERMAN: [00:20:25] We did.

PATRICE BECKHAM: [00:20:26] And so we anticipated that. It was actually a pretty good

guess; Kate probably helped us. So we did anticipate because the law changed on, you know, how the court fees were going to come in. But typically, absent a change in how those fees are going to be collected or calculated--

KOLTERMAN: [00:20:48] It doesn't change much.

PATRICE BECKHAM: [00:20:49] -- we just leave them. Sometimes you know they go down instead of up. It's just a tough one.

KOLTERMAN: [00:20:55] Okay.

PATRICE BECKHAM: [00:20:57] But they're not-- you know, the sort of key there is they're not related to payroll. So we kind of have this disconnect between how we're developing the contribution rates and how part of the money is coming in. And that makes the additional state piece much more volatile. Okay? All right. Page 11. We have really the same.

KOLTERMAN: [00:21:22] Pat, we have another question.

PATRICE BECKHAM: [00:21:23] Oh, I'm sorry.

STINNER: [00:21:25] I had looked at court fees I think over a four-year period of time and that trend looked to be going down instead of up. In this case, we're showing it going from 4,079 to 4,113, but I think if you do it five years back and did a trend line analysis to court fees actually going back as a trend.

PATRICE BECKHAM: [00:21:52] We did see that. I think back in 2015 we had seen that general

trend. They decreased from about $3.6 million to $3.1. And then, Kate help me out, but I think there were a couple of changes in law.

KATE ALLEN: [00:22:07] There was-- right. There was a bill that passed that staggered increases. I think they were two years apart. So one occurred I believe in maybe '16 or maybe '15 and then again in '17. And those are the last scheduled increases. There's no more scheduled increases after that.

STINNER: [00:22:27] We actually passed a court fee increase when Ernie Chambers was here?

PATRICE BECKHAM: [00:22:31] Not when he was here.

STINNER: [00:22:31] Not when he was. Okay.

PATRICE BECKHAM: [00:22:35] Just if you're interested page 8 of the Judges Retirement Report actually has about a 15-year period that shows what the court fees were. In the actual physical report--

STINNER: [00:22:51] Okay.

PATRICE BECKHAM: [00:22:54] -- on page--

KOLTERMAN: [00:22:57] He doesn't have access to it.

PATRICE BECKHAM: [00:22:58] Oh, he doesn't? I'm sorry.

KOLTERMAN: [00:22:59] I didn't give one of those to everybody.

PATRICE BECKHAM: [00:22:59] I thought you all had one of those.

STINNER: [00:23:02] He keeps some secrets.

PATRICE BECKHAM: [00:23:04] Anyway, they're so valuable.

KOLTERMAN: [00:23:05] I'll see to it that he gets one, Pat.

PATRICE BECKHAM: [00:23:06] All Right. But your memory is right, just it's been a few years back.

STINNER: [00:23:10] Okay.

PATRICE BECKHAM: [00:23:12] Great. Any other questions. Very good. Page 11. And this is a 30-year projection. Again, no court fees are being held at the current level for 30 years. It's not that I think that's a great assumption, it's just there's just no better assumption. So this has some limitations, but again I think the message is there are additional state contributions every year to make sure that the full actuarial contribution is made. And that's a function of again all the financing predicated on things as a level percent of payroll and payroll growing every year, which means dollars of contributions are growing. And whatever isn't covered by the members or the court fees falls to the state. And that's where that volatility comes in and we'll talk about that a little bit later as well. Page 12. So for all three of these systems it's what we call they're actuarially funded. So there is an actuary contribution rate that's calculated and the dollars related to that contribution rate or contributed every year. And if that happens and all assumptions are met you better see a

graph that's moving the funded ratio to 100 percent. That's what actuarial funding really is all about. And you see that here that by 2038 the Judges Retirement System reaches 100 percent funding and stays there. But it does take those additional state contributions to move the system to this point. All right. If there are no other questions, we'll move to the Patrol. Page 14. Similar information that you saw for Judges. Again, the unfunded actuarial accrued liability decreased as a result of favorable experience on both assets and liabilities down from about $70 million in the '17 valuation, about $62.5 million in this valuation, funded ratio moving up from 85 to 87. On the contributions side, the unfunded actuarial accrued liability is lower and therefore the contribution to fund that is lower, which results in an actuarial contribution rate that's about 1.7 percent lower than it was in the '17 valuation, right around 45.5 percent of payroll. The members contribute-- this is again a blended rate-- 16.08 and the state matches that. That still leaves an additional contribution rate of 13.37 percent. That is down from 15.15 percent of '17 valuation. You take that times the projected pay and that gives us the total required contribution and the additional required state is about $4 million. So the required is the statutory, the 16.08 and then the additional piece is about $4 million total state, it's about $8.8 million. Again, spend it on an actuarial basis, part of the contributions are fixed in statute and then the state makes the additional contribution, if needed. Page 15 is a five-year projection. As you can see, if all assumptions are met we expect there to be an additional state contribution around $4 million for the next five years. If returns are lower than 7.5, we'll expect that to go up. If they're better than 7.5, we'll expect it to go down. So like two sources of financing, that's been income or contributions. Page 16. The 30-year projection for the Patrol. Again, the blue bars are the employer statutory contributions, the green bars are the member statutory contributions. Those are the same amounts. And then the red bars are the additional amount of state contributions that would be expected, again, if all the actuarial assumptions were met. You'll notice that when we get to 2038 there are no longer any additional state contributions needed. We've improved the funding to the point where the statutory contributions are sufficient to cover the costs of the plan. And over this period you remember we do have a new tier for Patrol that has a little bit lower

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benefit structure and a higher contribution rate. So that's kind of helping with that trend as well. You see on the next slide 17 again about 2038 the system reaches 100 percent funding. And from that point forward if all assumptions are met those statutory contribution rates for both the member and the state are sufficient to cover. And actually you'll see that the funded ratio kind of being above 100. Money coming in is slightly higher than what's needed to pay the benefits for current members. A lot probably will happen in the next 20 years, but if it plays out as assumed that's what the trend looks like. Any questions on Patrol before we move on to School?

KOLTERMAN: [00:29:55] Senator Groene.

GROENE: [00:29:55] Looking at these numbers, like page 14, so that's 16.08 percent. Is that a percentage of their wages?

PATRICE BECKHAM: [00:29:55] Yes, sir.

GROENE: [00:29:55] And then we match 16 percent?

PATRICE BECKHAM: [00:29:55] Yes.

GROENE: [00:29:56] So if you look at that additional required statute, a percentage of the total required, that's basically about another 14 percent of pay. So we're at about 50 percent of the cost of retirement is total pay?

PATRICE BECKHAM: [00:30:05] The total contribution is just over 45.5 percent and the members are paying about 16, so it leaves you about--

GROENE: [00:30:14] So you factored in the additional requirement to come up with about 45 percent.

PATRICE BECKHAM: [00:30:21] Yes. We actually calculate the 45 first. That's the actuarial calculation based on the funding policy in statute and you subtract what the members are going to contribute. Then we subtract what the employer automatically contributes, because they match the member. And then the 13.37 percent of payroll is what's left as an additional state contribution and that's it. You know, so it's pretty variable because good or bad it all flows down to the bottom line.

KOLTERMAN: [00:30:55] Patty, is it fair to say though, you know we pay more in that category than anywhere else simply because they don't pay Social Security tax either. That's true, you know.

PATRICE BECKHAM: [00:31:06] Right. The ongoing cost of the benefits is higher because of the benefit structure, which reflects that they're not covered by Social Security. Right. And because of the nature of the job, they tend to have earlier retirement.

KOLTERMAN: [00:31:20] I think there is a required age to retire, is there not?

PATRICE BECKHAM: [00:31:23] Mandatory is 60.

GROENE: [00:31:27] So you're talking about funding--

PATRICE BECKHAM: [00:31:30] You're funding higher benefits over a shorter period of time-- means higher cost.

LINDSTROM: [00:31:36] Good questions. Does that answer your question, Senator Groene?

GROENE: [00:31:40] Retirement is expensive.

PATRICE BECKHAM: [00:31:45] Just to give you a breakdown on that 45 percent, about 30 percent of that is the cost for active members. And then the other 15 is the amortization catching up to pay for that $62 million shortfall, to put it in perspective. All right. Great question. So on to Schools. Page 19 . The same general outlay that you've seen for the other two systems. This is a bigger system so the numbers are bigger. The unfunded liability, again, it's down as a result of the gains on assets and liabilities. So we're unfunded actuarial accrued liabilities about $1.5 billion, down from about $1.7 last year, the funded ratio up to 89 percent. Again, when we look at the statute and calculate the pieces of contribution that comes up to 18.3 percent, down from last year. And then again we look at members are contributing 9.78 percent. And I might mention, they are covered by Social Security. The employers are paying 101 percent of the member rate, which is 9.88. And the state is contributing 2 percent of payroll. So those three together are 21.66 percent of pay. And that results in what we've generally been calling a contribution margin, which just means those fixed contribution rates are higher than the actuarial rate this year. And you can see the margin is up a little bit from last year. It was 2.35 last year, 2.93 this year. The good news that comes along with that means the state doesn't have any additional contributions for this plan. Since this payroll is a big number, that's good news. Okay. Any questions on the school, kind of the valuation results and then we'll look at the projections. Page 20 has the projections. And this actually includes projections for the state service, the state service annuity for certain members of the Omaha School Employees Retirement System and then the 2 percent of pay for Omaha. Those are the first two lines. And then you can see the red bars are the 2 percent of pay that the state contributes to the school retirement system and then the employer, the 101 percent the employers are putting in. And the black bars, which are nonexistent, is the additional state contribution. So, again, the next five years if we earn 7.5, we don't have to contribute any additional contributions

from the state. And having that margin helps improve the probability that you won't have to even if you don't earn the 7.5. Page 21 is a 30-year projection. Again, assuming all assumptions are met you would no-- there would be no additional state contributions for that entire period. You can see the dollars are increasing. And that's simply because payrolls are increasing. When you look over a 30-year period, payroll increases pretty significantly even when you have a pretty low. increase over a 30-year period. But the rates are stable. Page 22. Again, the system is actuarially funded and we just saw a little bit more money coming in than the actuarial rate, which means if we assume all the assumptions are met we'll reach full funding sooner. Like anything else, you're paying off your debt more rapidly. So for the school system the projected full funding date is actually 2028. Remember, the other two systems it was more like 2038. So 2028 here and then this holds everything static so it just assumes you keep plugging away and putting the money in and that's why you see the funded ratio continuing to increase about 105 percent. A lot of things will happen in the next ten years and beyond, but the trend line is what we're really looking for in these projections, what's the trend look like. So it's pretty exciting to look at a trend that's 100 percent funded in ten years. It's really, really good news. Page 23. This is, again, comparing the statutory contribution rates. That the member, the employers, and the state at 21.66 is the red line that you see on page 23. The blue line is the actuarial contribution rate. So I'll-- couple things are impacting the blue line. You can see it's going down till that 2027. We do new tiers, so people who are coming in to replace those who retire or leave employment are generally coming in have a lower cost plan. So that's driving the piece for current actives is trending down. We're also putting in more in contributions to pay off the unfunded liability. So we're driving that piece of the contribution rate down as well. And then we made to 2028 we're fully funded, we say we don't need as much money. Okay? Again, all this predicated on every single assumption we use being met every single year. The only thing I can tell you is that that will not happen, even if it's right over, you know, 20 or 30 years it won't happen every year. But the trend is what we're trying to look at our focus on here. And the reason is, because that difference between the red line and the blue line is that what we're calling the contribution margin is

very important because it allows this plan to have adverse experience without necessarily increasing the state's contribution. It's like an insurance policy of sorts. So if bad things happen we've got a little bit of a cushion that helps us absorb it and if bad things don't happen we get fully funded sooner. And the retirement systems just like everything else, once your debt is paid off you got a lot more options. So in that vein I wanted to share some information that we shared with the board that is kind of connected to a new actuarial standard of practice that will be effective for valuations in 2019. It has just to do with kind of improving the communication of the variability of investment return and the impact that has on funding contribution rates. So when we look at that contribution margin, again, it's really important and it really helps stabilize the state's contribution. So what this table is telling us is we can have a return in one year, from 2019, fiscal year '19, a return of a minus 2.75 percent and still not trigger an additional state contribution or we could have two years of a return of 2.25 percent without triggering an additional contribution or 4 percent for three years. You can see how to read the table. And if we look out ten years, again, if it were 6.25 every year for ten years we still would not trigger an additional state contribution. And there is a bit of a sense in the investment community that the next ten years might be a little less optimistic than longer term. So this, again, provides a significant degree of protection for the state by having that margin there to absorb potential adverse investment experience. When I say adverse, it just means less than 7.5, not necessarily negative. Does that make sense? This is a little bit of new information, but I think it's kind of helpful to put things in context. All right. Another piece of information that we're sharing with the board and we'll be developing additional materials in the 2019 valuations that we'll probably share with you, but one we wanted to get your feet wet with this year is called the asset volatility ratio. And, again, it's a way of looking at what's the impact on contribution rates funding if the actual returns are different than what's expected. And this asset volatility ratio is just equal to the market value of assets divided by payroll, because everything we're funding is over payroll. That number is an indicator of the impact of the volatility of investment return on the contribution rates. So the higher the number, the more volatility in the contribution rate. It's not good, bad, or

ugly necessarily, it's just informational because you think about it, if its market value of assets divided by covered payroll, if you're better funded you have a higher number, right? So you're better funded, you have more risk in terms of if the returns are not as expected there is more money in terms of dollars there that don't-- are not created. It's also as the plans mature their assets grow faster than payroll. That's pretty common. And then we've had a couple of systems that have had a decline in the active membership that will affect this asset volatility ratio. So let's look at the next page, page 26. And it's kind of fun for you guys, because you have three-- you actually have five different plans and the cash balance numbers look very different. But for these three plans the asset volatility ratio is 8.2 for the Judges, 14.9 for Patrol, and 6.1 for School. Well, what does that mean? Let's look at the table at the bottom of page 26. So if we have a return that's 10 percent lower than expected. So we're expecting 7.5 and instead, it's a minus 2.5. Okay? That's one standard deviation from a portfolio about which means it's not that uncommon. It could be higher or lower, but because we have a lot of volatility on the asset side it's important that we understand what that means on the contribution side. So you can see for Judges if that happens that 10 percent deviation is 82 percent of payroll. That's, you know, the 8.2 times the 10 percent. If we did not use the five-year smoothing we still amortize that experience over 30 years. That would change the contribution rate .3 percent. We do use smoothing so the first-year impact would just be under 1 percent, .13 percent. The same exact experience for Patrol would result in 8.47 percent of pay without the smoothing or 1.69 with the smoothing. And then you can see for Schools, again, the first-year impact, about .69 percent. So the same myths, so to speak, experience that's off by 10 percent has a very different impact on the contribution rate for these three plans simply because of the relationship between the assets and the payroll in those three plans. But you can see if we say it's not that and for there to be a variation of 10 percent, be it 10 percent higher or 10 percent lower, I can see how these contribution rates can really move. And, again, the first year is .93, 1.69 percent, but if there is a favorable experience to offset that there'll be additional pieces in subsequent years. So, again, we'll be doing some-- you know, still kind of kicking around the most effective way to try to communicate some of these little

more complex ideas and concepts. But we'll be trying to kind of build on this and helping you, you know, you have access to the model. That's another good way you can just plug in a return, see what happens, and compare it to the baseline. I wanted to spend just a couple of minutes with you though on this subject matter for Patrol and Judges, because those funding policies create a lot of volatility in the additional state piece. And you heard me say that when we went through the valuation results this is just another way to sort of think about that. That's why it's very hard to have reliable numbers for those because they're so volatile. But if we looked at Patrol on page 27, the first column of numbers is actual 2018. Those were the valuation results I just went over with you. The 45.53 percent, the actual rate, kind of trace it all the way down and the additional state contribution was just under $4 million. If instead of the actual return we had for fiscal year '18, which was 8.6 percent, it had been 10 percent lower, it would have been a minus 1.4 percent. The actuarial rate would be 47.22 percent. That's that 1.69 percent we just saw on the chart before. But you can see that the increase in the additional state contribution moves from about 4 to 4.5, which is you know about a 13 percent increase. It all flows down to the bottom line for the additional state piece and you'll see the same thing is true for judges on the next page. If the return had been 10 percent lower for fiscal year '18 instead of $443,000, we'd be at $665,000, almost a 50 percent increase. So I think for Nebraska, this is kind of a challenge. It's really the same with school with that big margin that's very helpful. It's kind of stabilized that. But for Judges and Patrol we know that we're going to have this volatility from year to year with the additional piece. Be it good or bad, it's just the nature of the impact of the actual [INAUDIBLE] return on the additional funding piece. And I wanted to make sure we spend a little bit of time today talking about that. That's a little bit of the fly in the ointment from a funding perspective, from a budgeting prospective. That concludes my presentation. Are there other questions or comments?

STINNER: [00:48:49] I was just thinking, if you go to a two-, three-, four-year period of missing projections to the downside and say that it's 10 percent or better, that accumulates doesn't it?

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PATRICE BECKHAM: [00:49:02] Actually, the minute that we missed the return the valuation captures that--

STINNER: [00:49:10] Right.

PATRICE BECKHAM: [00:49:10] -- and that says, you're going to have to start paying more money over the next 30 years--

STINNER: [00:49:16] So it will adjust [INAUDIBLE]. I was trying to figure that out.

PATRICE BECKHAM: [00:49:18] Yeah, the valuation sort of has an endpoint and whenever the experience is different than expected it recalibrates. The contribution says, I need a little bit more money now for the next 30 years to make up for what did not happen according to schedule. OK. Thank you.

LINDSTROM: [00:49:35] Any other questions from the committee? Seeing none, thank you very much.

PATRICE BECKHAM: [00:49:36] Thank you.

LINDSTROM: [00:49:37] Okay, we have another hearing, LR369, that will start at 2:30, so we have about six, seven minutes. We'll take a quick break and start up here at 2:30.

[00:49:37] [BREAK]

KOLTERMAN: [00:59:40] So the next thing up is Metro, Curt Simon, if he'd like to come forward and speak please. This hearing is to talk about the 2018 underfunded plan plans. We will have seven different plans that will be-- eight actually that will be discussed briefly this afternoon. We're going to start just in the essence of time, so Curt spell your name and thank you for your report.

CURT SIMON: [01:00:19] Thank you. Curt Simon, C-u-r-t S-i-m-o-n, I'm the executive director at Metro Transit, 2222 Cuming Street, Omaha, Nebraska 68102. And I wanted, if I could, to explain some of the variances in our LB759 report. I thought that might be the easiest way to proceed and some positive steps that have occurred between the last time I was here and today. So if you note on item 1a, funding status improved by six points between last year and this year. That's in large part because of a fairly robust return on investment that you see in 1c of 13.35 percent. However, it also is a result of changes in contributions by both the employer and the employee during the same one-year period of time where the employer moved their percentage from 6.5 percent to 7.5 percent and the employees move there from 6 percent to 7 percent. You might note that those returns also occurred-- if you look at item 1b, we've been very-- what we think is very conservative as it pertains to our assumed return of investment. You'll note that in 2013 it was 7.5 percent and we've reduced it throughout several years up until 2018 where we're assuming a 6.75 percent return on investment, which we think is much more conservative. It's a fairly mature plan that we have there. Other notable changes to the plan that occurred during the last year appear on item 6 on the second page. Most notably, we change the plan document to indicate that full retirement age would be at such time as that employee reached full retirement for the purposes of receiving Social Security. Prior to that it was age 65 was considered for retirement. We also tiered the plan for employees. Effective August 31, 2017, we tiered it based upon years of service as opposed to straight out 1.4 percent benefit formula that it was heretofore. In addition to that, we contributed a-- the company contributed 1 percent of wages lump sum to the plan in 2016 in order to bolster the plan. The current collective bargaining agreement runs through 2019, at which time we'll be looking at what

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the results are. We're on a calendar year as it pertains to our actuarial being done, so our next actuarial will be January 1, 2019. So we'll be looking at that very seriously to see what we need to do with working with our bargaining unit to continue to keep this in line. We're pretty confident that we're making the right positive moves together to get there. Are there any questions?

KOLTERMAN: [01:03:01] Just a general comment. If you keep this up you won't have to be back next year maybe.

CURT SIMON: [01:03:10] Well, I do love coming down and seeing you but--

KOLTERMAN: [01:03:16] I don't have any questions. Does anybody have any questions?

CURT SIMON: [01:03:19] Thank you.

KOLTERMAN: [01:03:20] I appreciate your time. Thank you.

CURT SIMON: [01:03:21] Thank you.

KOLTERMAN: [01:03:26] Okay, next we have Dr. Logan and Dave Kramer, OPS on behalf of OSERS.

CHERYL LOGAN: [01:03:49] Good afternoon. Senator Kolterman and members of the Retirement Committee, my name is Cheryl Logan, C-h-e-r-y-l, Logan, L-o-g-a-n, I am superintendent of Omaha Public Schools. While I have met several of you individually, this is my first chance to testify before the legislative committee. I thank you for the opportunity. With me is David Kramer who is outside legal counsel to OPS. He has been involved with OSERS for several

years and has the technical expertise in case you have detailed questions. As you may know, I was hired by the Omaha Public Schools in January and started as superintendent on July 1. While I was still back east, through the magic of technology I was able to watch events on-line including OPS board meetings and legislative proceedings. I was very much aware of the OSERS proceedings. I was very much aware of the OSERS funding issue and watched broad debate on LB548. Of course, you will remember that LB548 would have authorized pension obligation bonds to address the shortfall. The Legislature decided against that option and we have moved on from it. Since arriving in Nebraska, OSERS has been a top priority. I have had discussions with board members about it and I can assure you that the OPS board shares my concern with OSERS funding and its serious impact on the budget. This fiscal year we paid our ARC on a timely basis on July 11. We understand that this is our obligation. We also understand that it has a significant impact on our budget. We can continue to seek ways to mitigate that impact and therefore impacting our ability to deliver service to our 53,300 students. To that end I have had the opportunity to meet with Senator Kolterman and committee legal counsel and hope to continue to work closely with this committee. OSERS does not only affect only OPS. Many others are impacted, including current teachers and noncertificated employees, our retirees, administrators, students, and OSERS trustees. My view is that any resolution to OSERS funding must involve collaboration among those impacted. To that end OPS invited various stakeholders to participate in a series of meetings hoping to arrive at consensus solutions. These meetings have included OSERS, OEA, which is Omaha Educators Association, Nebraska State Education Association, SEIU, retirees, our administrators group, and GNSA. We have engaged an outside facilitator to guide the discussions. We believe that all participants understand that this will be a difficult process which will include some very tough decisions. We also believe that all stakeholders are participating in a good faith effort to reach consensus. We have already agreed in writing that any resolution impact all constituencies equally. It is my hope that our group can find consensus agreement that will protect the interest of all stakeholders to the fullest extent possible. But most importantly served are this-- importantly the

students that all of us serve. As the process continues we will keep Senator Kolterman and this committee apprised of our progress. Thank you for the opportunity to speak today and I will be happy to answer any questions that you may have. I will defer technical questions to Mr. Kramer.

KOLTERMAN: [01:07:20] Do we have any questions? Dr. Logan, I have just a couple of questions. I guess my first question would be, you know we looked at several options a year ago and unfortunately you weren't here yet, but is that still an ongoing process? Are you still looking at other funding options other than through your PRISM work?

CHERYL LOGAN: [01:07:46] We are looking at everything. We just began our work together as a group and we've had two-- OSERS has had two separate meetings where they have brought in experts where, for example, we met with-- on-line via the magic of on-line-- on an on-line meeting we met with a Minnesota group as they worked through their issues in 2010 and 2016 to kind of learn about some of the things that they went through and how they formed a coalition and were able to keep that coalition together. One of the things that I spoke about earlier with us all signing an agreement saying that we were going to agree that we will all be impacted equally was some-- one of the things that we adopted from the work that we saw in Minnesota. Just getting everybody to the table has been a lift and hopefully moving forward we can-- I'm confident that we can keep our coalition together. I do believe that everyone there is making a good faith effort and we are starting to look at several different things that could help us with our unfunded liability.

KOLTERMAN: [01:08:59] Okay. Senator Groene, you have a question?

GROENE: [01:09:00] Thank you, Chairman. Yes. I forget what school district you came from.

CHERYL LOGAN: [01:09:06] I was in Philadelphia.

GROENE: [01:09:07] And you were the superintendent?

CHERYL LOGAN: [01:09:09] No, I was the chief academic officer.

GROENE: [01:09:11] So you weren't involved-- just looking what experience you have. What was the retirement situation where you came from? Was it troubled, too, like most?

CHERYL LOGAN: [01:09:22] In the Commonwealth of Pennsylvania?

GROENE: [01:09:23] Yes.

CHERYL LOGAN: [01:09:23] Yes, very much so. Yes.

GROENE: [01:09:25] So you've seen this before?

CHERYL LOGAN: [01:09:27] I have, yes.

GROENE: [01:09:27] And you've been involved? Have they done anything with theirs or are they just kicking the can down the road?

CHERYL LOGAN: [01:09:34] I don't believe that they're kicking the can down the road. They did several things, especially for folks who were new coming on board and changing the way that the benefits were structured. So their resolutions and the Commonwealth were much more weighted on new employees, increasing the amount that folks paid into the system. Now, there is a difference, that there's only one-- it was only one system for the entire state. Making sure that all districts made

their payments, so adding some controls and to make sure that all districts paid into their 500

districts in the state of Pennsylvania, the Commonwealth of Pennsylvania and making sure all paid

in in a timely fashion.

GROENE: [01:10:22] Thank you.

CHERYL LOGAN: [01:10:23] You're welcome.

GROENE: [01:10:25] Senator Stinner.

STINNER: [01:10:34] Welcome.

CHERYL LOGAN: [01:10:34] Thank you, Senator Stinner.

STINNER: [01:10:34] There is-- in this report there's currently $131 million of deferred,

unrecognized investment [INAUDIBLE] by 11 percent of the market value and because of

smoothing techniques five years we need to offset that by investment gains. Any feel for where

you're at with that in terms of having to fund an additional contribution should that happen?

CHERYL LOGAN: [01:10:59] So one of the things that we are doing in our own budget is

looking at sustainability, realizing that we're going to have to make that payment. We will have--

we are working right now on our budget for 1920 [SIC]. We'll have a rough cut budget by the time

we leave for winter break, which is the 21st, that includes the ARC payment that we anticipate

making and any potential changes in our budget structure which really are our fixed costs, looking

at our fixed costs so that-- our fixed recurring costs so that we are ready to act and to adopt a budget

that will allow us to make our payment. In addition, we also are looking at our fund balance. We

have a obligation to have a fund balance between 10 and 20 percent. We are trying to make sure our fund balance never dips below 15, actually, and that would like to keep it closer to 18 percent on balance is a rainy day fund, and it rains. And so we are trying to make sure that we-- because that is another way for us to be sure that we can make a payment. For every 1 percent of fund balance represents about $6 million dollars. And so we have-- are looking at making sure that we keep that fund balance at a healthy and in a healthy position realizing that there is variability in the ARC payment based on returns.

STINNER: [01:12:32] Okay. And the fund balance is actually your cash reserve balance and you're carrying, if the computation is right, about [INAUDIBLE] to carry about a $30 million cushion in your budget. I think that's right.

CHERYL LOGAN: [01:12:47] Well, it could be as high as that, but it depends on if it's between 15 and 20. Yes that's correct.

STINNER: [01:12:52] Okay. And that should be enough to take care of this contingency should it so happen?

CHERYL LOGAN: [01:12:58] Well, it's a lot of-- because we're counting on we're factoring in what we project our state aid to be and many other things in terms of that, so there's variability in that as well. But we feel like we-- it was going to be difficult for us to maintain this payment, but we are going to structure our budget in a way that will allow us to do it to the best of our ability.

STINNER: [01:13:33] Okay. And you are highly reliant on state aid. Do you know that percentage?

CHERYL LOGAN: [01:13:38] I do not. I apologize. I did not know the percentage.

STINNER: [01:13:40] Somewhere along the line I think it's like 40 to 44 percent. What is it, Mike?

GROENE: [01:13:43] I think it's over 50, isn't it?

CHERYL LOGAN: [01:13:49] I'll find out the exact number. I'm not sure if anybody on our team knows the exact number, but I'm not sure of the exact number so I don't want to misspeak.

STINNER: [01:13:56] OK. So you are highly reliant on that. You do have a considerable amount of debt. You have this contingent liability out there. And you're trying to build a cash cushion or cash reserve that would accommodate some of these contingencies. Is that--

CHERYL LOGAN: [01:14:11] Well, we need to be prepared so that we can run our district for our students, yes.

STINNER: [01:14:15] OK. I noticed in 2017 we did-- or actually, effective July 2018 we created a new tier of the retirement or the rule of 85 from 55 to 60. Is there any other modifications that you can see that we can do that would reduce some of this?

CHERYL LOGAN: [01:14:37] Those are some of the bills, are some of the things that we're currently considering and studying. So the group that I spoke with you about a couple months ago, that would be some of the things that we'll take under consideration. One of the things that we don't want to do is become that divergent from the NPERS system. And so we have to consider any moves that we may be harmonious with the NPERS system.

STINNER: [01:15:05] OK. That's all. Thank you very much.

KOLTERMAN: [01:15:06] Senator Groene.

GROENE: [01:15:09] I mean, that's all in this new process, but have you looked at levy override vote? Wouldn't it be more reliable if you went to the people and said, we're going to go three cents and it's dedicated to this, to our problem with our retirement and then not worry about the fluctuations of state aid versus--

CHERYL LOGAN: [01:15:30] We have-- that is something that we will likely consider.

GROENE: [01:15:34] I mean, this school bond election, you could probably sell that if you made a commitment that it was-- that's where the money was going just to. Make it more reliable.

CHERYL LOGAN: [01:15:44] Thank you. Okay, thank you.

KOLTERMAN: [01:15:46] Dr. Logan, I have just a couple of questions for you. I know you-- I believe the school board, OPS, is working with the-- under the auspices of PRISM. Did you hire them to work with you to follow a model?

CHERYL LOGAN: [01:16:02] No. That sounds like OSERS. I'm not sure. I don't know if Cecilia [PHONETIC] is here.

KOLTERMAN: [01:16:05] Well, you have a working group.

CHERYL LOGAN: [01:16:08] Right.

KIOLTERMAN: [01:16:08] And then OSERS also has a sustainability working group. Is that not correct?

CHERYL LOGAN: [01:16:13] Yeah, they have a group and we have a group. Our consultant, yes, she worked-- that's the name of her company. I'm sorry. So I don't-- I didn't really associate her with the company, I just think about her. Yeah.

KOLTERMAN: [01:16:23] How are those two organizations coming together? Are you working hand-in-hand?

CHERYL LOGAN: [01:16:27] Well, the-- I will say that one of the things that we did at our last meeting with our facilitator, who works for PRISM, I'm so sorry, was to have OSERS do a presentation of the work that we-- what we learned from Minnesota. So that is the way that we have them there. They are a crucial piece of the group. I am a ex officio member of the board-- of OSERS' board, so I also attend those meetings and bring that information back to the board. And actually, those meetings are open to the public. So each of the individuals who is represented actually usually sends a representative to the OSERS workshops, that's where they're called, as well, so they're also very well aware. So SEIU, OEA, etcetera send a rep to that workshop. That rep is also usually the person who also comes as part of this collaborative group that we put together.

KOLTERMAN: [01:17:31] Okay.

CHERYL LOGAN: [01:17:31] We do recognize that-- I'm sorry.

KOLTERMAN: [01:17:33] No, go ahead.

CHERYL LOGAN: [01:17:33] I mean, we do recognize that having OSERS as a fully participating member is crucial to moving this forward.

KOLTERMAN: [01:17:40] Just a couple of other questions. Right now you make your ARC payments, and you made it in July, have you ever given any consideration to doing those on a monthly or quarterly, semiannual basis which would, in essence, help your dollar cost average into the plan, into the investments.

CHERYL LOGAN: [01:18:04] It's something that we may also consider. I have our interim CFO, chief financial officer, Ms. Courtney Bird, is looking at that and trying to make a decision on whether to make a recommendation to the Board of Ed if we should go in that direction.

KOLTERMAN: [01:18:22] And then one last question from me is, in the past couple of years there's been some interest in-- OPS has an interest in having the PERB board manage the plan or NPERS manage the plan. Do you still have an interest in that?

CHERYL LOGAN: [01:18:39] Well, the Nebraska Investment Council does the investments now. And I would say, generally, from the Board of Education there is an interest.

KOLTERMAN: [01:18:47] Okay. Thank you. Any other questions? Thank you very much.

CHERYL LOGAN: [01:18:54] Thank you. I appreciate it.

KOLTERMAN: [01:18:56] I appreciate you coming.

CHERYL LOGAN: [01:18:56] No problem.

KOLTERMAN: [01:18:57] We'll continue to dialogue.

CHERYL LOGAN: [01:18:58] I'm sure we will. Thank you.

KOLTERMAN: [01:18:59] Mr. in den Bosch, which one is this? This will be the Omaha Civilian Plan.

BERNARD in den BOSCH: [01:19:39] Possibly more information, maybe too much.

KOLTERMAN: [01:19:44] You guys killed another tree, huh? Actually, I assume you're just going to go from the Omaha Civilian right into the Omaha Police and Fire.

BERNARD in den BOSCH: [01:19:58] If that's OK.

KOLTERMAN: [01:19:59] Thank you.

BERNARD in den BOSCH: [01:20:00] Obviously, you'll tell us when you're done with one of those and one will go on with the other.

KOLTERMAN: [01:20:16] Okay. Go ahead and start off.

BERNARD in den BOSCH: [01:20:20] I'll go. Bernard in den Bosch, first name, B-e-r-n-a-r-d, last name is three words, first word, i-n, second word, d-e-n, third word, B-o-s-c-h, deputy city attorney for the city of Omaha.

PATRICE BECKHAM: [01:20:37] Patrice Beckham, P-a-t-r-i-c-e, Beckham, B-e-c-k-h-a-m, with Cavanaugh Macdonald, the retained actuary for the system.

BERNARD in den BOSCH: [01:20:45] And what I think we've decided to do is we've described the plan that we've had in place. [INAUDIBLE] and do a presentation, a walk-through of a lot of it and then if there's any questions or any additional things we'll obviously both try to help you with as many answers as we can, hopefully.

PATRICE BECKHAM: [01:21:05] Right. Glad to be back. And we kind of put a presentation together to think this may be a little more cohesive. And we won't take a lot of time. We'll try to keep this moving, because I know you have plenty of folks to listen to, but think a little bit of background is helpful. On page 2, just a reminder that the Omaha city ordinance requires essentially a 50-50 split of costs between the city and the members. The benefit provisions, including contribution rates, are negotiated in the labor contracts so they don't move automatically. The contribution rates are set until there's a new labor agreement in place. And this system includes employees that are covered by several different bargaining groups and there aren't any anticipated pension changes, I think, for '18 and beyond at this point in time. Page 3. I think given that we're talking in 2018 results it's good to sort of look back and remember the history for both this plan and the police or fire plan. The funding outlook after the Great Recession in 2008-09 was pretty grim. The plan was projected to be depleted, run out of money in about 20 years or so. So there were significant changes made to both benefit provisions and contributions at the end of 2014 beginning in 2015. Those included a lot of the similar things that were occurring across the United States for public plans' later retirement age. The benefit accrual was lower. It was two and a quarter times years of service. It was lowered to 1.9 for future years of service only. Benefits moved from a high one-year average to high five, with some phase-ins there of disability was significantly decreased.

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City increased their contribution rate by 7 percent and then, pretty importantly for employees hired on or after March 1 of 2015, they are now covered by a cash balance plan which this group is familiar with that because Nebraska has a cash balance plan for both state and county employees. It's sharing the preretirement investment risk directly with the employees, because there is a guaranteed interest credit of 4 percent but the additional what we call dividend, additional credit, interest credit, is based on actual returns, not assumed. So if actual returns are lower, essentially account balances are lower, benefits are lower.

BERNARD in den BOSCH: [01:23:49] And, ironically, in approximately the three years we've had a cash balance plan we've had approximately a 29 percent turnover in employees. So roughly 29 percent of our employees are actually now in the cash balance plan.

PATRICE BECKHAM: [01:24:00] Page 4, just a little bit again historical or background information on the funded ratio, the funded status. You can see in 2009 about 63 percent funded. And, you know, the sharp drop is, again, asset smoothing. We're recognizing the investment return in 2008 over this period. You can see kind of a bounce back in 2015. That was a result of the changes, the benefit changes in the labor contracts that decrease the actuarial accrued liability. And then there's a decrease in 2018. We'll talk about a little bit more detail; it's due to assumption changes. Page 5, just comparing the blue bars of the actuarial required contribution, and the red line is the actual employer contribution. And you can see for a period from 2009 through 2015 there was less money actually going in than what was actuarially needed to move the plan towards full funding on the schedule that was in place. The last couple of years there's actually been a little more coming in on the actual contributions than the actuarial rate, so that's a significant change. On page 6 we talked earlier about the normal cost rate, how much needs to be paid each year to cover the benefits for active members. So what this is showing you very clearly is that the changes in 2015 lowered the costs of this plan from about 14 to 10 percent of pay. So that's a significant change in

the value of the benefits. And we don't get all of that immediately, okay, because this is the ongoing costs for actives. But when the same percent of payroll is coming in if we only need 10 percent to fund the benefits for current people we'd have more money to pay off the unfunded liability. And over time, as more and more people are in the lower cost plan we have additional dollars to help fund the unfunded liability. So moving to the 2018 valuation, according to state statute an experience study was performed in 2017, results presented to the board in 2018. The board did take action, adopted all of the recommended assumptions. Most significantly, there was a reduction in the inflation assumption from 3.25 to 2.5. That's a pretty big change in one movement. That impacted the other economic assumptions. Most importantly, investment return assumption was reduced from 8 percent to 7.5. We had to sort of weigh wages in the general economy move. That's part of the individual salary increase assumption. That was lowered from 4 to 3.10. And then payroll growth, again, how covered payroll in aggregate will increase over time was reduced from 4 to 3. And, again, now we see with a cash balance plan if we assume the returns are going to be lower, we assume the interest crediting rate will be lower as well. That's that kind of risk sharing. We also adopted the most recent mortality table RP-2014 and use a one-year setback for females. So a 65-year-old female is assumed to exhibit the mortality of 64, better than the table, and that did have a pretty significant impact for the system's funding as well. On page 8 you can see the 2018 valuation results. If we had used the old assumptions, those being the set of assumptions used in the 2017 valuation, compared to the new assumptions which were what the board adopted. Again, you can see the increase in actuarial liability was $27.5 million flows straight through to the unfunded liability, so it would have been about $196 million, but instead it's $223 million. And that's simply due to the change in the assumptions. The funded ratio decline would have been 56 percent, decline of 53, and then the very bottom line, the very last row of this table, the contribution margin this year would have been 1.65 percent and instead there is a contribution shortfall of 2.21 percent. So the change in assumptions impacted the contribution rate by almost 3.9 percent of pay, a very, very significant change. We make those changes because we think that's a better estimate of what the

future holds. We can't control what the market-- rate of return on market is or how long people are going to live. All we're trying to do is come up with the best estimate of the future that we can gather at this point in time. Page 9, you can kind of see the last three valuations. Again, 2018 is going to look worse than it really was because of the assumption change. It looks like the unfunded liability went up from 2017; it actually would have gone down except for the assumption change. But we've-- actually, I think-- the way I like to look at it is we've improved the probability of meeting our assumptions and therefore have kind of a better track to expect it to follow those projections going forward.

KOLTERMAN: [01:29:51] Doesn't that also take into effect the change in mortality?

PATRICE BECKHAM: [01:29:55] Yes. All assumptions, yes, exactly. And then you can see in the '16, '17 valuations again we had a contribution margin. This year we've got a shortfall. Membership information on page 10. Really, the important piece of information here is the very first line, active members. In the '18 valuation we had 1,222. Look to the far right, under 2015 you can see we only had 1,143 at that point in time. As there are more members, it has a positive impact on the funding because we're collecting a fixed contribution rate. More people, more payroll, more dollars helps fund their unfunded liability more quickly. Page 11, kind of comes back to Mr. in den Bosch's comment about the cash balance plan. The red bars are members in the cash balance plan. The blue bars are those in the legacy, the final pay plan. We're up to 27 percent of the active membership in the '18 valuation is in the cash balance plan. That's important because that liability will grow more slowly and we'll react to actual experiences, different than expected, in a more favorable way than the final pay plan. But no doubt about it, most the liability is still with the legacy plan. Page 12 is a comparison of market and actuarial. We did sort of flip, January 1 of '17 actuarial was higher than market deferred losses. January '18 now market is higher than actuarial by $3 million. You can see the return on market was almost 13 percent for 2017, on an actuarial

smooth basis was 8.5. So we did have a gain on assets. And then the next page is just a glimpse of the actual liability by group. And the thing I like about this chart is it makes it very clear there's a lot of liability for inactive members, which essentially can't change. So it's the blue part of the pie is people who are currently receiving benefits, including the red pieces for disabled members and the yellow for those who are active, entitled to a benefit in the future. So, really, we've got about 25 percent of the pie for active members, which is when we went through the benefit changes and reform in 2014 really only got 25 percent of the pie that you can modify at all to impact the funding. And that's why it's very hard to move funding from 55 percent to 80 percent in one fell swoop. It just can't happen absent a really large influx of money. Page 14, change in the unfunded liability. The only thing I want to point out on this page, again, the assumption change under 2017, $27 million. You won't see any other numbers on any of these years anywhere close to that. That was a very, very significant [INAUDIBLE] for the retirement system. Page 15. A little bit more detail on the pieces of the contribution. You can see ongoing it costs about 10 percent of pay to pay for current actives and 21 percent of pay to pay off the system's unfunded liability. And that's really the challenge.

BERNARD in den BOSCH: [01:33:39] And I'll just hit on one thing here. The first point that was made in the presentation is, is that the city and the employees' contributions are to be roughly equal. When the changes were made in 2014 to go into effect in 2015, the employees made their contribution by reduction in benefits and the city made theirs by an increase in cash. That's why you see the disparity, but there was an actuarial amount placed on that reduction in benefits to ensure that the employees and the city were both contributing similar or the same amount or to try to help the, obviously, the huge problem that existed, the tremendous problem that existed.

PATRICE BECKHAM: [01:34:23] Great point. And just to clarify, just because there's a contribution shortfall because the money that's coming in right now in this year is less than the

actuarial rate doesn't mean that the system will never be fully funded. We are a lot of moving parts here and the only way we really get insight into that is do a projection similar to what we-- what I showed you for the state's three retirement systems earlier. And I'm going to in the interest of time just ask you to move to page 18. Again, this is assuming all assumptions are met and actually nothing else changes. There's no change in the benefit structure, there's no change in the number of active members. And so what we see is that by 2048, so in 30 years, the system gets to 100 percent funding. So it doesn't-- it's a shortfall because it isn't going to hit its targeted full funding date, but the money keeps coming in and eventually it gets to 100 percent funding. It is worth noting though that, you know, it's about 2034, 2035 before the funded ratio is above 60 percent. So kind of treading water here for a little bit and then as, again, more and more people are in the cash balance plan and that cost goes down, we have more money to throw to pay off our debt. We're kind of reversing that and then would, you know, I think pretty rapidly move from 60 to 80 in about 10 years. So while some might look at this and think it doesn't look that good, I would just remind the committee that in 2009 that was projected to be depleted about 2029. This is, you know, far-- a great improvement compared to that. So we need to think keep in mind where this system has been and the challenges with everything being negotiated. Any questions?

KOLTERMAN: [01:36:30] Senator.

STINNER: [01:36:30] I'm going to referred to page 11, which is active members and then cash balance versus final pay chart. If I understand this right, it's grown at about a 9 percent clip of people coming in or the turnover rate is around 9 percent. Not all of that 9 percent I know is going to be retirement-age people. Tell me what that demographic looks like, that 9 percent that's turning over. And it looks like maybe a hundred people or better per year. Are 50 percent of those taking away retirement benefits or are they early folks that just leave because there's opportunities of some other place that won't be in your--

BERNARD in den BOSCH: [01:37:27] I think you're probably right because I think historically you would expect that number to be 90 percent or something. I think you're finding probably turnover in a greater ratio of people that are leaving early. Obviously, the economy is strong. There's opportunities for other jobs so we do see some people leaving because they get--

STINNER: [01:37:46] And you cut your benefits.

BERNARD in den BOSCH: [01:37:47] And we've certainly reduced our-- not only our pension benefits and our pension. Ten percent right out of the top makes it difficult for employees who are making $15 or $16 an hour, which is what a significant percentage of the people in the civilian system are here. Blue collar workers who aren't necessarily making a lot, so a lot of those folks have a tendency to leave or pursue other opportunities. So I think you're 50 percent number is probably fairly accurate.

STINNER: [01:38:20] So it-- actually in two years you'd be at 45 percent if you continue to go at 9. So half of it's there. How does that-- how do you figure that into your calculation?

PATRICE BECKHAM: [01:38:31] It's amazing what computers can do.

STINNER: [01:38:34] I'm saying, shouldn't you narrow that gap a little quicker?

PATRICE BECKHAM: [01:38:37] Well, these projections-- well, not this one, but the one that you've looked at at the end had all the actuarial assumptions are met. And we have assumptions that people will leave before they're retirement eligible. We have assumptions that once they're eligible how many are going to leave and when and all that plays out. And when those bodies leave, the

model brings in new people. And the new people are in the cash balance plans. So we actually, through the modeling we could go through and get sort of a breakdown each year of what the future populations look like. It's a little deceiving in the first few years because it's going to grow faster and then it's going to kind of slow down because some of these people are going to leave; current cash balance people leave and be replaced by people in the cash balance plan.

STINNER: [01:39:25] Right.

PATRICE BECKHAM: [01:39:25] Because your highest turnover is probably your first five years. But it-- over time we could actually model out if that's something you want to see next year.

STINNER: [01:39:32] I don't. I'm just trying to figure out--

_____: [01:39:35] I'd like to see it.

PATRICE BECKHAM: [01:39:35] Yeah, you might want to see it.

STINNER: [01:39:35] If we have included this, I mean, it looks like, like I said, in two years 50 percent of your whole squad that's working is going to be covered on your cash balance which should relieve some of the pressure from and actually close that gap, that funding gap quicker. But you say you have put that into your assumptions?

PATRICE BECKHAM: [01:39:58] Yeah, it's in the very last page, those numbers that you saw, it is in there.

STINNER: [01:40:04] OK.

PATRICE BECKHAM: [01:40:05] I do think it's going to slow down a little bit because, you know, in your first year every single person that leaves goes into the cash balance plan. But think about ten years from now a lot of those people--

STINNER: [01:40:16] You do a lookback every year anyway and change--

PATRICE BECKHAM: [01:40:18] We capture everything that happens every year. And we have had a little bit of a growth in the number of active members, but even when half of the active population is in the cash balance plan, most of the liability is in the old plan because those are the people close to retirement.

STINNER: [01:40:35] I get that. Right.

PATRICE BECKHAM: [01:40:37] Or who have already retired.

KOLTERMAN: [01:40:39] Senator Groene, do you have a question?

GROENE: [01:40:41] Yes, Chairman. On page 10 you've got active members. The membership information is that on the defined benefit plan or the cash balance or combined?

PATRICE BECKHAM: [01:40:53] Combined.

GROENE: [01:40:53] So the money is blended?

PATRICE BECKHAM: [01:40:54] Yes, it's one plan. Do you want to answer instead of me? It's

one plan with two benefit structures. So just like, if you think about your school retirement system--

GROENE: [01:41:02] Tiers.

PATRICE BECKHAM: [01:41:02] -- you have tiers. This is a tier, it's just the second tier is the cash balance plan. It's still a defined benefit plan.

GROENE: [01:41:11] And the payroll deduction is the same for both members?

PATRICE BECKHAM: [01:41:14] Yes.

GROENE: [01:41:15] So the new members are having to fund the old retirees is what you're saying.

BERNARD in den BOSCH: [01:41:22] The combination of the new members and the city contribution, because obviously you have-- the benefit the employee is getting is still greater than what they're putting in. But I would say that certainly the percentage of the city's contribution or whatever, there's more of the money putting in this is funding the old.

GROENE: [01:41:44] So you'd get more people on the cash balance, it costs you less, the city less payment. But what you're saying is, as you get more of those you're still going to budget the same amount you did. And that extra money is going to go basically to an ARC. And that's how you're going to catch up? Is that what you're saying?

PATRICE BECKHAM: [01:42:06] Yeah, to pay the unfunded liability. Right.

GROENE: [01:42:06] All right. You'd never really explained where the extra money was coming from--

PATRICE BECKHAM: [01:42:11] Oh, I'm sorry.

GROENE: [01:42:11] -- for them to catch up, but--

PATRICE BECKHAM: [01:42:13] Yeah. And It's important to remember for these plans is different than the state retirement systems where those are actuarially funded. So whatever the actuarial contribution rate is that's what goes in or more in the schools' situation. Here the rates are fixed, so in a way-- I don't want to say it doesn't matter, but that's the actuarial contribution is not directly impacting the money going into the plan, which is why the projections are so valuable because the projection says given your current funding how long will it take before you're fully funded, if ever. Back in 2009, the answer was not only never but the fund is depleted in 20 years. So it's a very different funding dynamic here. And you'll see the same thing with police and fire.

GROENE: [01:43:01] And do you do that on purpose, try to make sure you hire older people at 36 years of age so they have a less payment at the end?

BERNARD in den BOSCH: [01:43:10] [INAUDIBLE] You appreciate-- this group is a group that includes not only blue collar workers I described before, it also includes the white collar managers and professionals, it includes professionals in that it includes assistant directors and attorneys and accountants who generally are longer before-- they take longer to be educated and need more experience before they can be hired, so it's a blended group, a very diverse group of employees.

KOLTERMAN: [01:43:44] Any other questions? We're going to close that and we're going to

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move on to police and fire.

BERNARD in den BOSCH: [01:44:00] And I assume you want us to introduce ourselves again.

GROENE: [01:44:02] No, you're all right. Just keep going.

PATRICE BECKHAM: [01:44:40] So format and content very similar to what we just went through for the employees. So this is a city of Omaha Police and Fire Retirement System. Again, on page 2, by city ordinance there's a 50-50 split of the costs between the city and members. Benefit provisions and contribution rates are negotiated in labor contracts. The system includes employees from four different bargaining groups. Two have agreements in place through the end of 2018, I believe that's fire. And two of the police union, police management actually having agreements that are in place through 2020. Again, significant changes negotiated to the benefit provisions and contributions in October of 2010 for the police union and December 2012 for the fire union. As Bernard mentioned earlier for the civilians plan the 50-50 allocation of costs the city can only put in money. The members took benefit reductions and there were some increases in contributions and that's how they equaled the 50/50 split. Again, we saw similar trends. Later retirement age requiring 30-years of service for the maximum benefit instead of 25. There had been kind of an issue with the system was a high one-year final [INAUDIBLE] salary with the additional compensation paid in that final year. This Career Overtime Average, COTA is kind of what we call it, was put in place to kind of smooth that out and get away from that spiking in the pension amounts.

BERNARD in den BOSCH: [01:46:27] And that was for active employees of the-- new hires, actually their pension is based solely on their base pay.

PATRICE BECKHAM: [01:46:37] Right. And then for fire members, a maximum benefit of 65

percent instead of 75 percent and then, of course, increased contributions from the city. Page 4, you can kind of see the funding change in the funded ratio over--

KOLTERMAN: [01:46:54] Patty, before you go on can I ask a question about that page 3? Am I correct, you set up a second tier for all employees or did existing employees negotiate reduced benefits?

BERNARD in den BOSCH: [01:47:18] So effectively what they did is-- yes, existing employees negotiated reduced benefits and I would argue will probably set up two different tiers, one tier for police and then another tier for fire. There were some difference in when it went to into effect and how the changes occurred that have some differences between the two. So police negotiated a second tier. Fire negotiated a tier that's slightly different, which is why you have the lower maximum benefit. But yeah, the city-- you have the contributions before that occurred. There was a slight-- the city was paying a little bit more as a result of a couple of lawsuits that were decided back in the' 70s. But then when it came to the reform that occurred in late 2000, 2010, and in late 2012 there were-- this is what the city is putting in and the unions-- the employees match that through reduction in benefits, some for current and of course a number for future employees as well.

KOLTERMAN: [01:48:19] So I just want to make sure I'm understanding that correctly. So you got a fireman that's been out here for 25 years and he's getting close to retirement. He was getting his based on 70 percent or 75 percent of their-- I guess that would be police, but does everybody then go to that 65 percent or does--

BERNARD in den BOSCH: [01:48:45] No, that was just for new hires.

KOLTERMAN: [01:48:46] Just for new hires.

BERNARD in den BOSCH: [01:48:47] When this was implemented for fire, at that point in time you had 25 years in and age 45. Those things changed because they moved it up.

KOLTERMAN: [01:48:58] It changed, but not for-- just for the new hires.

BERNARD in den BOSCH: [01:49:01] It changed somewhat for active and there were some people who might have been close to retirement that it didn't change much. It changed for existing people and then, obviously, it changed much more dramatically for new hires.

KOLTERMAN: [01:49:21] Okay. This process--

PATRICE BECKHAM: [01:49:23] Yeah. It's kind of complicated because dependent on their years of service at the time of their contract.

BERNARD in den BOSCH: [01:49:28] And If you ever had the specifics--

KOLTERMAN: [01:49:30] No, but it was all negotiated with the--

BERNARD in den BOSCH: [01:49:34] It was.

PATRICE BECKHAM: [01:49:35] But the current members did, essentially, take a reduction in benefits. It was more material for those further from retirement. Is that fair to say? And then new-- the new hires generally had the lowest cost tier, but the current members also took a reduction. All right. So I think we're on page 4. And, again, you can see the funded ratio. I mean, don't

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underestimate. It went from about 42 percent funded in 2010 to 52 percent, a 10 percent move in the funded ratio over a ten-year period. It's pretty significant to the positive, especially, you know, this plan had the same trend of going down and running out of money in 20 years. Page 5, similar to what you observed with the civilian plan that things are now close to an actuarial amount going in. Why is that important? Well, it means that we're closer or more likely to hit our funding target of reaching full funding and the amortization period that's set by the board. And on page 6, again, I like these graphs. The normal cost rate. So this is the value of benefits for active members. Okay, so in 2009 they were all pretty similar. Benefit structure was probably about a 29 percent of pay plan, not covered by Social Security. You could see that the decline in 2011. That was when the police contract was first reflected in the valuation. So we've got police and fire combined here. So you can see a pretty significant drop. And then you see another significant drop in 2013 when the fire contract is reflected in the normal cost. So those changes didn't have any new hires in there. Those were current active members. And it, you know, decreased the ongoing costs of the plan. Again, by decreasing the ongoing cost it frees up money to pay off the unfunded liability. Experience study for police and fire the board did adopt all of the recommended changes. Again, same change in inflation from 3.25 to 2.5. The investment return assumption was lowered from 8 to 7.75. These plans have different boards, different asset allocations, and that resulted in different expected returns over both the short and longer term. And the expected returns for police and fire is higher and that's why it's 7.75 compared to 7.5 for the employees' plan. Again, the general wage increase would decrease from 4 to 3.25. That impacts individual salary increase projections, which impacts projected benefits. No change in the mortality assumption for this plan. The actual experience was pretty darn close to what was anticipated by the mortality table. We're using the RP-2000 mortality table. It sounds really old, but it's not because we are projecting mortality improvements in the future. So we've already projected it from 2000 to 2018 and we're projecting improvements beyond that. And that's why I think the actual experience is pretty close to what we observed. Page 8, actuarial methods. For amortization they actually moved to methods similar to what you use, what's

in state statute for amortizing the unfunded liability where there's sort of layers or pieces of unfunded liability. And then the police union contract had an increase in contributions by both the members and the city of 7.5 percent for 2018 through 2020. And so that's first reflected in the '18 valuations. The next slide you can see the impact of the assumption change . It increased the actuarial liability by $41 million. That flows straight through to the unfunded actuarial liability, so we would have been at $608 million, instead were at $649 million. The unfunded ratio would have been about 54, knocked it down to 52. And, again, we would have had a contribution margin of 1.84 percent. That swung it to a contribution shortfall of 1.91 percent, 3.8 percent of pay. So you can see small changes [INAUDIBLE] return assumption, pretty powerful impact when it comes to funding. And that's a little bit getting back to some of the information you had earlier in the presentation on the state system. Page 10, a lot of the same information but put kind of side by side with the previous two valuations. Again, you know, this year absent the change in assumptions we would have seen the unfunded liability go down and the funded ratio go up. We held steady at 52 percent. Again, we have a contribution shortfall. I don't think that means right now we need to be necessarily worried or making additional changes, but we need to keep an eye on that and an eye on the projections. Page 11 Is interesting, I think. This is looking at the two tiers. So Tier 2 for police are those hired after January 1, 2010, and for fire those hired after January 1, 2013, could kind of see the counts in the pie graph makes it a little easier to compare. There are, you know there's a higher percentage of tier 2 members for the police plan.

BERNARD in den BOSCH: [01:55:52] And you'd expect that because it's longer, but one of the other things that's occurring is, is we're trying to-- we've budgeted an increased number of police officers so that that number is growing because the budgeted amount of police officers is also increasing. And, quite frankly, it's supposed to be I think at 900. We're still having a hard time getting there because if you hire-- if you train 60 police officers a year and 30 retire every year you only end up with a net of 30.

PATRICE BECKHAM: [01:56:23] All right. And that growth will help from a funding standpoint as well. Slide 12 is asset values. Similar, a return of almost 15 percent on market for police and fire system resulted in a 9 percent return on actuarial that produced a gain on assets. We had a gain on liabilities. And we now have that kind of deferred investment gain, that strong return sort of flipped before market was less than actuarial, now market is greater than actuarial. Page 13. You saw the same kind of a graph before looking at kind of actives or inactives and active liability. We take all the inactive liability, it's about 65 percent of the total. The red, the true red is the active fire liability and the light blue is the active police liability and they're pretty close. Again, the police have had that lower tier in place longer, and lower benefits, lower liability. Page 14. On that far left-hand set of numbers you can see, again, the assumption changes the $41 million. That's the big driver of the results of the '18 valuation. Page 15. Again, showing you've been having what I would call a small contribution margin the last several years. The assumption change was enough to flip that to a shortfall, but it does not mean that the system will never be funded. It's just not going to make it in its scheduled time frame. And if you look at page 18, again, it's more for trend, it's not like we're saying this is exactly what's going to happen. But the idea is if the assumptions are met over the long term the system is moving to 100 percent funding and the trend is up. And that's really what we're looking for when we do these kind of projections. So at this point in time it is projected to reach 100 percent in 2046. Obviously, as every year we have favorable or unfavorable experience different than what is anticipated by the assumptions, it's going to move that date. But what we want to keep an eye on is the trend, but that's expected to go up.

KOLTERMAN: [01:58:44] So question. Pat, would you talk a little bit about the civilian plans, 7.5 percent assumed rate and police and fire are at 7.75. It seems like for some reason all of our plans, we've moved them all down to 7.75. Explain the difference between that-- 7.5, excuse me.

PATRICE BECKHAM: [01:59:20] Right. And my understanding is that all the money that's invested by the Nebraska Investment Council, the asset allocation is the same for all that money.

KOLTERMAN: [01:59:30] Correct.

PATRICE BECKHAM: [01:59:30] But here you have two separate trusts, two separate boards that have different asset allocations.

BERNARD in den BOSCH: [01:59:37] And one trust looks roughly double the size of the other because the police and fire trust is more than double as far as the assets.

KOLTERMAN: [01:59:45] Which one?

BERNARD in den BOSCH: [01:59:47] The police and fire is more than double the assets of the civilian system. It's a lot more to invest and potentially being able to get things with a higher yield.

PATRICE BECKHAM: [01:59:55] And you have-- you know, a different board has a little bit different view of risk. But asset allocation is the driver to the expected rate of return. And so that difference really did result in about a quarter of a percent difference. And in actuality, you know, based on some of the information or I know police and fire because we had more discussions there, could've made an argument to stay at 8 based on the data. It's still short term, long term. But the short term does not look as optimistic to the tune of generally it's about a 1 percent lower rate of return but longer term expectation is that it will be better. And I know that you know, we had some discussions and I think the actuarial committee had some discussions without me about whether to make that change or not, because the longer term view is that the return will be 8.8--

KOLTERMAN: [02:01:07] Good luck with that.

PATRICE BECKHAM: [02:01:08] -- compared to 7.4 in the short term. The truth of the matter is, you know, nobody knows, I mean.

KOLTERMAN: [02:01:14] Who knows is right.

PATRICE BECKHAM: [02:01:15] Who knows is right. But, you know, I really respect them because they did kind of lower the rate of return that was based on our recommendation because the maturity of the plan because of the unknown and the short term. That difference between short and long term is so significant that it feels a little more comfortable to be a little bit of the conservative side. But the numbers could have supported staying at 8.

STINNER: [02:01:47] My observation is appear that far underfunded, cut down to the 7.5 throw in a little more. Try to close the gap a little faster, that would be my guess. And then you can make your 8.8. That'll make it more-- faster.

KOLTERMAN: [02:02:03] Any other questions?

BERNARD in den BOSCH: [02:02:04] Thank you.

KOLTERMAN: [02:02:07] Well, I would just say that unlike some of these plans you're going to be coming back for a few years.

BERNARD in den BOSCH: [02:02:14] I was wishing I was in the same position as Metro Area Transit, but I didn't know if I should make such a joke. Well, thank you. And, hopefully, we didn't

go into too much detail but I know you want some, so.

KOLTERMAN: [02:02:27] No, it's good. We like detail.

BERNARD in den BOSCH: [02:02:29] Thank you.

PATRICE BECKHAM: [02:02:30] Thanks.

KOLTERMAN: [02:02:30] Thank you.

BERNARD in den BOSCH: [02:02:31] Have good holidays.

KOLTERMAN: [02:02:34] Okay. Douglas County, you're up next. Mr. Lorenz, is that correct?

JOE LORENZ: [02:02:51] Yes. Good afternoon, senators. My name is Joe Lorenz, last name is spelled L-o-r-e-n-z, and I'm the Douglas County finance director. And so I'd like to give you the update on the current status of the Douglas County defined benefit plan. And I'm just going to run through basically the information on the reporting form that we provided to you. First, with a snapshot of the plan in 2018. The plan is 68 percent funded. Our assumed rate of return is 7.5 percent. The actual investment return from an actuarial sense last year was 11.4 percent. Well, from a market return it was 16.8, so you can see the effect of smoothing there on the actuarial return. The members and the employee contribution rates are 8.5 percent. It's one of those that's 50 percent funded by the county and 50 percent funded by the employees. Normal cost, 11.2, which has been pretty consistent. The actuarial ARC on the plan is $1.3 million. The actual dollars contributed, I was just looking at that today as we're about to make the year end contribution. It's going to come in at probably a little over $23.5 million. So we'll keep up what we've been doing the past few years of

contributing slightly more than the ARC. So that's kind of a snapshot of the plan. Now I'll just go back a couple pages to the narrative and kind of take you through the history of the plan and how we got to where we are today. Our actuaries are Silverstone and the last valuation they performed was on January 1, 2018. And that report said the plan was 68 percent funded, had net assets on an actuarial basis of $315 million and had an unfunded actuarial liability of $148.5 million. The plan has 3,666 participants and, as I said, equal member-employer contribution rate of 8.5 percent of pay. Normal cost was $14.4 million and the ARC was 23.1 and funded a ratio increased year over year from 67.2 to 68 percent. To understand why the Douglas County DB plan is only 68 percent funded, it's important to look back at the history and the changes to the plan. In 1996, our plan was 97.8 percent funded. In that same year there were changes made to the plan, first for law enforcement and then in 1977 for all other plan participants when the county provided a reduced benefit upon rule of 75 and the benefit formula increased from 1.5 percent of pay per year of service to 2 percent. In those late '90s and early 2000 we were also providing COLAs with a COLA of 4 percent in 2000, 3 percent in 2002. Amazingly, by the year 2004 the funding ratio had fallen to 64.8 percent. The first thing that was done was the county and member contributions increased from 5.5 percent of pay to 8.5 percent of pay by 2008. Poor stock market performance during the Great Recession also negatively impacted the plans' funded ratio which reached the low point of 57.8 in 2010. At that time the members of the pension committee and the county board recognized that substantial changes had to be made to the plan to ensure the financial viability of the plan for current participants. It was a very conscious decision that we wanted to maintain a traditional defined benefit plan. We didn't want to have to go to like a cash balance plan. Instead we came back and really, like somebody said here, we decided to deal with the issue and not kick the plan down the road, kick the can down the road. And so we made the following changes effective December 31, 2011. We eliminated the rule of 75. We changed benefit formula from 2 percent of pay per year to 1.5 percent and we made-- the maximum retirement income was reduced from 60 percent of the participant's final average compensation of 45 percent. Sheriff's deputies who account for about 10

percent of the total plan total have slightly different plan provisions, which provide for increased benefits with early retirement. And I think the point is, we made these changes going on six years ago and what we've been able to do is since our low point we've increased the plan funding ratio by 10.2 percentage points to 68 percent. But this is what I always talk about is that a mature defined benefit plan takes-- you can make changes immediately like we did in the late '90s that have a dramatic impact on funding. But to bring the funding back up takes time. And so while we made these changes seven years ago and brought the funding up ten points, it's still really going to be another ten years before we hit that, according to actuarial projections, that we'll hit that magic 80 percent funded rate. So that's just one of the issues that you deal with in a mature defined benefit plan that it really takes time. But we did really take corrective action seven years ago, but it's just taken a long time to show the results. But if you look at our trend line it is definitely trending up to where we like it to be. So the next page you can see that the funding ratio in 2028 is projected to be close to 80 percent. In ten years after that we would be at 96 percent, close approaching 100 percent funding. We've tweaked the plan a little bit, you know, in putting things like the new mortality table in, changing the interest contribution on what's paid for people who leave the plan. And we've also changed the amortization period and the rates of early retirement and termination of employment were revised. And these [INAUDIBLE] tweaking the plan which had a slight positive impact. But where we are now is we feel we're on a good trend and that the plan is continuing to remain a viable employee benefit. The other point I want to bring up is that you asked about in your list of questions is that there-- that we are having ongoing negotiations with several collective bargaining groups, which represent county employees in which they are requesting that the county would institute a drop program for their members. The adoption of a drop program could impact the funding of the county's pension plan. But at this time, the county board has not agreed to any of the proposals to institute a drop program. And with that, I would open it up to any questions.

KOTERMAN: [02:11:11] Questions, anybody? Just from our experience, a drop program not just

could, it will, it will impact.

JOE LORENZ: [02:11:25] Yes. And my advice to the county commissioners is that they should only entertain a drop program that would be funding neutral [INAUDIBLE] pension plan.

KOLTERMAN: [02:11:35] Good idea. Thank you very much, Mr. Lorenz.

JOE LORENZ: [02:11:36] Okay. Thank you.

KOLTERMAN: [02:11:38] It looks like we'll see you next year.

JOE LORENZ: [02:11:40] Yeah, I'm going to be back for a while. Okay, thank you.

KOLTERMAN: [02:11:45] Appreciate you being with us. Okay, now we have OPPD. Welcome.

JAVIER FERNANDEZ: [02:12:08] Good afternoon, Chairman and members of the committee. My name is Javier Fernandez. I'm the chief financial officer for Omaha Public Power District. That's spelled J-a-v-i-e-r, last name, F-e-r-n-a-n-d-e-z. And you are being distributed the report that was submitted to the committee a couple of weeks ago, just in case you don't have it already. Happy to answer any questions that you may have on the report. Happy to report we will continue to follow the plan. We continue to make every single payment as required by our annual required contribution and our funding did increase from 2017 to 2018 by 1 percent from 69 percent to 70 percent. We did not make any changes, any material changes to the assumptions. We have a what we believe is a conservative discount rate of 7 percent that was reduced from a 7.75 in 2015. Now it's 7 percent. We actively continue to talk to our investment advisors about the potential reduction or change to that discount rate. That is certainly something that is on the table. But for now it's still

a 7 percent discount rate. We experienced positive earnings last year just like everybody else. Our earnings after fees, net of fees were 16.49 percent in 2017. Twenty eighteen is not necessarily turning out to be such a great year. We don't have final results, but I am very skeptical that we will have the same returns as in 2017. Our employee contributions in 2018 increased from 6.2 percent of payroll to 6.7 percent. We achieved a five-year contract with our unions that include an increase of about half a percent every year going-- starting at 6.2 percent in 2017, going all the way up to 9 percent by 2021. These are employee contributions. As I mentioned earlier, we have made every single payment, to the penny, on our ARC every year. Our annual [INAUDIBLE] contribution for 2017 was 53.1 percent, 53.6 percent in 2018. And we are-- next week our board will vote on approving our budget for 2019 where we are including fully payment of our ARC as well. Something that I've heard, a few questions I've heard this afternoon. We make payments every month, it's not every six months or every year. We have the ability to start making those payments every month, which helps with the dollar cost averaging but also helps with additional earnings in years like in 2017. With that, I'll answer any questions you may have.

KOLTERMAN: [02:15:08] Any questions? Thank you.

JAVIER FERNANDEZ: [02:15:12] You're welcome.

KOLTERMAN: [02:15:15] That was pretty painless, wasn't it?

JAVIER FERNANDEZ: [02:15:15] Thank you.

KOLTERMAN: [02:15:18] Thanks for coming. Appreciate it. And one last presenter, Eastern Nebraska Health Service Agency. Are you Glen? Welcome, Glen.

GLEN GAHAN: [02:15:53] Thank you. Good afternoon, Chairman Kolterman and the rest of the members of the Retirement Committee. My name is Glenn Gahan, last name spelled G-a-h-a-n, I'm an actuary with the SilverStone Group here on behalf of the Eastern Nebraska Human Services Agency employees retirement plan. And I'm going to touch on some of the highlights of the information we have previously provided to the committee. And just before I get into some of those information, just background. For this plan we would do a formal actuarial report every two years. The most recent one was completed as of January 1, 2018. And the members make a set 2.75 percent of pay contribution. And the agency makes an annual set contribution not directly tied to the actuarial determined contribution. And through the presentation we'll touch on the actual contributions made compared to the actuarially determined contribution. So some of the material that was presented, the funded status as a 2018 is 74 percent. This increase from 71 percent in the last actual valuation in 2016. That 74 percent includes a change in assumption when the mortality table was updated to a table based on our RP-2000 with projection in 2016 to RP-2014 with projection in 2018. Measurement and consistent assumption basis would have been 77 percent, but it's 74 percent funded because of the change in the mortality table. The assumed rate of return on plan assets is at 7 percent and it's been that assumption for many years. The most recent two years of investment performance was 11.7 percent in 2017 and 6.8 percent in 2016. So in total, there's been some actual gains on investment performance. The employer contribution rate is currently at 9.5 percent. That's increased by 50 basis points since 2000, it was at 5.5 percent. So it's been a 73 percent increase by agency contributions over that period time. The plan's normal cost is currently 7.4 percent of pay. Subtracting out the 2.75 percent of employee contributions would be a net of 4.65 percent. I'd compare that to the agency's 9.5 percent of pay in the excess of 4.85 percent goes to fund the unfunded liability. For the past four years the agency contributions has exceeded the actuarial determined contribution. The most recent, 2017, they contributed over 108 percent of the actual determined contribution. In the calculation of the actuarial determined contribution, in addition to the updated mortality table there was a method change as well where previously the

unfunded liability was amortized over a 30-year period on an open group-- open basis, meaning each valuation there was a new 30-year amortization. Well, that was changed this most recent year to be a 25-year fixed on a closed layered basis. So after 25 years that current unfund would be fully amortized and then in future years gains or losses or change in assumptions or provisions would be amortized over a prospect of 25-year period. There was a updated forecast of the funded percentage done this year and, as I said, we're currently 74 percent funded. We forecasted based on current assumptions that the funding percentage would exceed 80 percent in 6 years and would exceed 100 percent in 24 years. Of course, when you go out that far, as you know, experience will differ from assumptions and actual percentage might be significantly higher or lower than that projection. With that, that hits the highlights of the information and the valuation results and I would open up for any questions on that.

KOLTERMAN: [02:20:25] Going in the right direction.

GLEN GAHAN: [02:20:27] Yeah, this year.

KOLTERMAN: [02:20:27] Maybe next year. All right. Any questions? Okay. With that, appreciate your coming.

GLEN GAHAN: [02:20:39] Thank you very much.

KOLTERMAN: [02:20:40] It will all be put in the record. That concludes all the hearings for the day. I would like to visit with the committee just briefly if you have time. I don't think we have to go into executive session on.