

# Ohio Public Employees Retirement System

Actuarial Valuation Of Defined Benefit Allowances –  
Traditional, Combined and Member Directed Plans  
December 31, 2019



# Table of Contents

<i>Section</i>	<i>Pages</i>	<i>Item</i>
	1-2	Cover Letter
<b>I</b>		<b>Executive Summary</b>
	1	Introduction
	2-5	Summary of Pension Defined Benefit Valuation Results
	6	Comments and Conclusion
	7	Other Observations
	8	Financing Defined Benefit Pension Promises
	9-14	Summary of Active and Retired Member Information
	15-18	Summary of Pension Experience
	19-21	Risk Measures - Commentary and Summary of Measures
<b>II</b>		<b>Financial Information</b>
	1	Consolidated Asset Reconciliation
	2-5	Development of Funding Value of Pension DB Assets
	6-9	Allocation of Funding Value of Assets Among Divisions
	10	Comparison of Rates of Return & Asset Values
<b>III</b>		<b>Benefits and Conditions Evaluated</b>
	1-22	Summary of Benefits
	23-28	Sample Benefit Computations
<b>IV</b>	1-5	<b>Recommendations for Reserve Transfers</b>
<b>V</b>	1-8	<b>State Division</b>
<b>VI</b>	1-8	<b>Local Government Division</b>
<b>VII</b>	1-8	<b>Public Safety Division</b>
<b>VIII</b>	1-8	<b>Law Enforcement Division</b>
	1	Members in Valuation
	2	Employer Contributions to Support Retirement Allowances
	3	Comparative Statement of Contribution Rates
	4	Development of Unfunded Actuarial Accrued Liabilities
	5	Comparative Schedule of Funding
	6-8	Statistical Schedules
<b>IX</b>		<b>Allowances Being Paid to Retirees and Beneficiaries</b>
	1	Totals by Year of Retirement
	2	Totals by Years of Service
	3-8	Annuity and Pension Reserve Fund
	9-17	Survivor Benefit Fund
	18	Historical Averages
<b>X</b>	1-14	<b>Actuarial Methods and Assumptions</b>
<b>XI</b>		<b>Financial Principles</b>
	1-5	Principles and Operational Techniques
	6-7	Glossary
	8	Meaning of “Unfunded Actuarial Accrued Liabilities”
<b>XII</b>	1-10	<b>Additional Schedules</b>



August 21, 2020

The Retirement Board  
Ohio Public Employees Retirement System  
Columbus, Ohio

Ladies and Gentlemen:

The results of the **December 31, 2019 Annual Actuarial Valuation of Defined Benefit Allowances** of the Ohio Public Employees Retirement System (OPERS), based upon Chapter 145 of the Code as amended, are presented in this report. The gain/loss analysis of experience by division, the annual actuarial valuation of retiree health and Medicare benefits, projections of defined benefit allowances and projections of retiree health and Medicare benefits are covered in separate reports. The purposes of the valuation are as follows:

- Measure the financial position of OPERS,
- Assist the Board in establishing employer and employee contribution rates necessary to fund the pension defined benefits provided by OPERS,
- Determine the number of years required to amortize the unfunded actuarial accrued liabilities based upon established contribution rates,
- Provide actuarial reporting and disclosure information for the System's financial report; and
- Analyze the experience of the System over the past year.

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

The signing actuaries are independent of the plan sponsor.

The individual member statistical data required for the valuations was furnished by your Executive Director and Staff, together with pertinent data on financial operations. Their cooperation in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data.

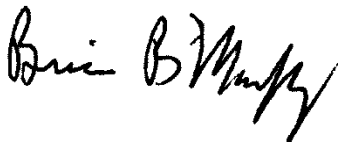
Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

The actuarial assumptions used in the valuation are summarized in Section X of this report. The assumptions are established by the Retirement Board after consulting with the actuary.

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

Brian B. Murphy and Mita D. Drazilov are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Mita D. Drazilov, ASA, FCA, MAAA

BBM/MDD:sc

**SECTION I**

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**EXECUTIVE SUMMARY**

# Introduction

Section 145.22 of the Revised Code of Ohio (ORC) provides in part as follows:

“(A) The public employees retirement board shall have prepared annually by or under the supervision of an actuary an actuarial valuation of the pension assets, liabilities, and funding requirements of the public employees retirement system as established pursuant to this chapter.”

This report presents the results of the December 31, 2019 annual actuarial valuation of the Ohio Public Employees Retirement System (OPERS) Defined Benefit Allowances of the Traditional, Combined and Member Directed Plans. In conjunction with Chapter 145 of the ORC, the purposes of performing the annual valuation are as follows:

- Measure the financial position of OPERS,
- Assist the Board in establishing employer and employee contribution rates necessary to fund the pension defined benefits provided by OPERS,
  - Employer contribution rates for the State are established for a two-year period based upon the results of odd-year valuations. The December 31, 2019 valuation is used to establish the contribution rates for the two-year period beginning July 1, 2021
  - Employer contribution rates for local governments are established annually. The December 31, 2019 valuation establishes employer contribution rates for calendar year 2022.
- Determine the number of years required to amortize the unfunded actuarial accrued liabilities based upon established contribution rates,
- Provide actuarial reporting and disclosure information for the System’s financial report; and
- Analyze the experience of the System over the past year.

The report is presented as follows:

Section I	-	Executive Summary
Section II	-	Financial Information
Section III	-	Benefits and Conditions Evaluated
Section IV	-	Recommendations for Reserve Transfers
Section V	-	Valuation Results for State
Section VI	-	Valuation Results for Local Government
Section VII	-	Valuation Results for Public Safety
Section VIII	-	Valuation Results for Law Enforcement
Section IX	-	Allowances Being Paid to Retirees and Beneficiaries
Section X	-	Actuarial Methods and Assumptions
Section XI	-	Financial Principles
Section XII	-	Additional Schedules

There have been no significant benefit changes since the last valuation. Please see Section III for a detailed description of the benefit provisions.

A summary of the primary valuation results as of December 31, 2019 are presented on the following pages.

# Summary of Pension Defined Benefit Valuation Results

## Traditional, Combined, and Member Directed Plans

### December 31

#### (\$ in Millions)

	2019						2018	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
<b>A. Demographic Information</b>								
1. Number Counts								
a. Active Members								
i. Traditional Plan (TP)	100,393	177,329	277,722	59	8,062	8,121	285,843	284,808
ii. Combined Plan (CP)	2,769	4,780	7,549	0	0	0	7,549	7,739
iii. Member Directed Plan (MD)	3,781	6,744	10,525	0	0	0	10,525	10,849
iv. Total	106,943	188,853	295,796	59	8,062	8,121	303,917	303,396
b. Retired Number Counts	75,619	140,178	215,797	190	5,437	5,627	221,424	219,075
c. Deferred/Inactive Number Counts	292,040	342,394	634,434	57	1,308	1,365	635,799	611,340
d. Total Number Counts	474,602	671,425	1,146,027	306	14,807	15,113	1,161,140	1,133,811
2. Active Payroll								
a. DB Active Members								
i. Traditional Plan (TP)	\$ 5,193	\$ 7,768	\$ 12,961	\$ 3	\$ 564	\$ 567	\$ 13,528	\$ 13,143
ii. Combined Plan (CP)	182	257	439	0	0	0	439	429
b. Other Payroll								
i. Reemployed Retirees	\$ 88	\$ 316	\$ 404				\$ 404	\$ 401
ii. Member Directed Plan (MD)	229	370	599				599	585
iii. Alternative Retirement Plan (ARP)	579	0	579				579	554
<b>B. Defined Benefit Assets</b>								
1. Market Value (MV)	\$ 35,022	\$ 52,363	\$ 87,386	\$ 39	\$ 4,390	\$ 4,429	\$ 91,815	\$ 81,427
2. Rate of Return on MV							17.08 %	(2.97)%
3. Funding Value (FV)	\$ 33,785	\$ 50,514	\$ 84,299	\$ 37	\$ 4,235	\$ 4,273	\$ 88,572	\$ 84,287
4. Rate of Return on FV							9.11 %	5.06 %
5. Ratio of FV to MV							96.5%	103.5%
<b>C. Defined Benefit Actuarial Results</b>								
1. TP & CP Normal Cost as a % of Payroll	14.35%	14.21%	14.27%	18.58%	21.05%	21.02%	14.55%	14.60%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 14,544	\$ 21,739	\$ 36,283	\$ 9	\$ 2,106	\$ 2,115	\$ 38,398	\$ 37,536
b. Retired	28,103	39,182	67,285	54	2,810	2,864	70,149	68,430
c. Deferred/Inactive	1,148	1,625	2,773	1	50	51	2,824	2,739
d. Total	\$ 43,796	\$ 62,546	\$ 106,341	\$ 64	\$ 4,966	\$ 5,030	\$ 111,371	\$ 108,705
3. Unfunded AAL (UAAL) (FV Basis)	\$ 10,010	\$ 12,032	\$ 22,042	\$ 26	\$ 731	\$ 758	\$ 22,800	\$ 24,418
4. Unfunded AAL (UAAL) (MV Basis)	\$ 8,774	\$ 10,183	\$ 18,955	\$ 25	\$ 576	\$ 601	\$ 19,556	\$ 27,278
5. Funded Ratio (FV Basis)	77.1 %	80.8 %	79.3 %	58.5 %	85.3 %	84.9 %	79.5 %	77.5 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>								
	29	20	23	N/A	16	16	23	27
<b>E. Defined Benefit Contribution Rates</b>								
1. Pension Contributions								
a. Employer Normal Cost	4.74%	4.58%	4.65%	6.58%	8.05%	8.02%	4.79%	4.85%
b. Member Contribution Rate #	9.61%	9.63%	9.62%	12.00%	13.00%	13.00%	9.76%	9.75%
c. UAAL Contribution Rate	9.26%	9.42%	9.35%	11.52%	10.05%	10.08%	9.38%	9.32%
d. Total	23.61%	23.63%	23.62%	30.10%	31.10%	31.10%	23.93%	23.92%
2. Retiree Health Contribution Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3. Total Employer Contribution Rate	14.00%	14.00%	14.00%	18.10%	18.10%	18.10%	14.17%	14.17%

\* Based on i) schedule of employer and member contribution rates shown on page III-3 and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions. For the 2019 results, the amortization years shown are from December 31, 2020. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2022.

# 2018 and 2019 member contribution rates reflect 0% for Combined Plan members.



# Summary of Pension Defined Benefit Valuation Results

## Traditional Plan

### December 31

#### (\$ in Millions)

	2019						2018	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
<b>A. Demographic Information</b>								
1. Number Counts								
a. Active Members	100,393	177,329	277,722	59	8,062	8,121	285,843	284,808
b. Retired Number Counts	75,330	139,491	214,821	190	5,437	5,627	220,448	218,226
c. Deferred/Inactive Number Counts	291,080	341,122	632,202	57	1,308	1,365	633,567	609,234
d. Total Number Counts	466,803	657,942	1,124,745	306	14,807	15,113	1,139,858	1,112,268
2. Active Payroll								
a. DB Active Members	\$ 5,193	\$ 7,768	\$ 12,961	\$ 3	\$ 564	\$ 567	\$ 13,528	\$ 13,143
b. Other Payroll								
i. Reemployed Retirees	\$ 88	\$ 316	\$ 404				\$ 404	\$ 401
ii. Member Directed Plan (MD)	229	370	599				599	\$ 585
iii. Alternative Retirement Plan (ARP)	579	0	579				579	\$ 554
<b>B. Defined Benefit Assets</b>								
1. Market Value (MV)	\$ 34,739	\$ 51,953	\$ 86,693	\$ 39	\$ 4,390	\$ 4,429	\$ 91,122	\$ 80,877
2. Rate of Return on MV							17.08 %	(2.97)%
3. Funding Value (FV)	\$ 33,512	\$ 50,118	\$ 83,630	\$ 37	\$ 4,235	\$ 4,273	\$ 87,903	\$ 83,715
4. Rate of Return on FV							9.11 %	5.05 %
5. Ratio of FV to MV							96.5%	103.5%
<b>C. Defined Benefit Actuarial Results</b>								
1. Normal Cost as a % of Payroll	14.59%	14.44%	14.50%	18.58%	21.05%	21.02%	14.78%	14.84%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 14,371	\$ 21,508	\$ 35,879	\$ 9	\$ 2,106	\$ 2,115	\$ 37,993	\$ 37,164
b. Retired	28,082	39,143	67,225	54	2,810	2,864	70,089	68,379
c. Deferred/Inactive	1,139	1,614	2,754	1	50	51	2,805	2,721
d. Total	\$ 43,592	\$ 62,265	\$ 105,857	\$ 64	\$ 4,966	\$ 5,030	\$ 110,887	\$ 108,265
3. Unfunded AAL (UAAL) (FV Basis)	\$ 10,080	\$ 12,147	\$ 22,227	\$ 26	\$ 731	\$ 758	\$ 22,984	\$ 24,549
4. Unfunded AAL (UAAL) (MV Basis)	\$ 8,853	\$ 10,312	\$ 19,164	\$ 25	\$ 576	\$ 601	\$ 19,765	\$ 27,388
5. Funded Ratio (FV Basis)	76.9 %	80.5 %	79.0 %	58.5 %	85.3 %	84.9 %	79.3 %	77.3 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>								
	30	20	24	N/A	16	16	23	28
<b>E. Contribution Rates</b>								
	CY 2022						CY 2021	
1. Pension Contributions								
a. Employer Normal Cost	4.59%	4.44%	4.50%	6.58%	8.05%	8.02%	4.65%	4.72%
b. Member Contribution Rate	10.00%	10.00%	10.00%	12.00%	13.00%	13.00%	10.13%	10.12%
c. UAAL Contribution Rate	9.41%	9.56%	9.50%	11.52%	10.05%	10.08%	9.53%	9.46%
d. Total	24.00%	24.00%	24.00%	30.10%	31.10%	31.10%	24.31%	24.30%
2. Retiree Health Contribution Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3. Total Employer Contribution Rate	14.00%	14.00%	14.00%	18.10%	18.10%	18.10%	14.18%	14.18%

\* Based on i) schedule of employer and member contribution rates shown on page III-3 and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions. For the 2019 results, the amortization years shown are from December 31, 2020. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2022.





# Summary of Pension Defined Benefit Valuation Results

## Combined Plan

### December 31

#### (\$ in Millions)

	2019		2018	
	General		Grand Total	Grand Total
	State	Local		
<b>A. Demographic Information</b>				
1. Number Counts				
a. Active Members	2,769	4,780	7,549	7,739
b. Retired Number Counts	202	457	659	569
c. Deferred/Inactive Number Counts	960	1,272	2,232	2,106
d. Total Number Counts	3,931	6,509	10,440	10,414
2. Active Payroll	\$ 182	\$ 257	\$ 439	\$ 429
<b>B. Defined Benefit Assets</b>				
1. Market Value (MV)	\$ 275	\$ 394	\$ 669	\$ 532
2. Rate of Return on MV			17.06 %	(3.03)%
3. Funding Value (FV)	\$ 266	\$ 380	\$ 646	\$ 552
4. Rate of Return on FV			8.92 %	5.36 %
5. Ratio of FV to MV			97%	104%
<b>C. Defined Benefit Actuarial Results</b>				
1. Normal Cost as a % of Payroll	7.47%	7.58%	7.52%	7.55%
2. Actuarial Accrued Liability (AAL)				
a. Active	\$ 173	\$ 231	\$ 404	\$ 372
b. Retired	14	24	37	30
c. Deferred/Inactive	9	11	19	18
d. Total	\$ 196	\$ 265	\$ 461	\$ 420
3. Unfunded AAL (UAAL) (FV Basis)	\$ (70)	\$ (115)	\$ (185)	\$ (132)
4. Unfunded AAL (UAAL) (MV Basis)	\$ (79)	\$ (129)	\$ (208)	\$ (112)
5. Funded Ratio (FV Basis)	135.7 %	143.3 %	140.1 %	131.3 %
<b>D. Amortization Years to Fully Amortize UAAL *</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>E. Contribution Rates</b>				
	CY 2022		CY 2021	
1. Total Normal Cost	7.47%	7.58%	7.52%	7.55%
2. Member Contribution Rate	0.00%	0.00%	0.00%	0.00%
3. Employer Normal Cost	7.47%	7.58%	7.52%	7.55%
4. Other Contributions #	6.53%	6.42%	6.48%	6.45%
5. Total Employer Contribution Rate	14.00%	14.00%	14.00%	14.00%

\* Based on i) schedule of employer and member contribution rates shown on page III-3 and ii) Entry age actuarial cost method reflecting additional future normal cost savings anticipated to occur as Group A and Group B members are replaced by new hires subject to Group C benefit provisions. For the 2019 results, the amortization years shown are from December 31, 2020. For Actuarially Determined Employer Contribution (ADEC) purposes, amortization years are determined based upon scheduled contribution rate changes, if any, through 2022.

# Other contributions include: amortization payments for the pension UAAL, mitigating contributions, and contributions to the retiree health care fund.



# Summary of Pension Defined Benefit Valuation Results

## Member Directed Plan

### December 31

	2019			2018	
	General			Grand Total	Grand Total
	State	Local	Total General		
<b>A. Demographic Information</b>					
1. Number Counts					
a. Active Members	3,781	6,744	10,525	10,525	10,849
b. Retired Number Counts	87	230	317	317	280
c. Deferred/Inactive Number Counts	0	0	0	0	0
d. Total Number Counts	3,868	6,974	10,842	10,842	11,129
2. Active Payroll	\$ 229	\$ 370	\$ 599	\$ 599	\$ 585
<b>B. Defined Benefit Assets</b>					
1. Market Value (MV)	\$ 7,927,862	\$ 15,914,150	\$ 23,842,012	\$ 23,842,012	\$ 19,260,428
2. Rate of Return on MV				18.21 %	(3.24)%
3. Funding Value (FV)	\$ 7,588,447	\$ 15,232,820	\$ 22,821,267	\$ 22,821,267	\$ 19,916,815
4. Rate of Return on FV				9.41 %	5.81 %
5. Ratio of FV to MV				95.7%	103.4%
<b>C. Defined Benefit Actuarial Results</b>					
1. Normal Cost as a % of Payroll					
2. Actuarial Accrued Liability (AAL)					
a. Active	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
b. Retired	7,588,447	15,232,820	22,821,267	22,821,267	19,916,815
c. Deferred/Inactive	0	0	0	0	0
d. Total	\$ 7,588,447	\$ 15,232,820	\$ 22,821,267	\$ 22,821,267	\$ 19,916,815
3. Unfunded AAL (UAAL) (FV Basis)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
4. Unfunded AAL (UAAL) (MV Basis)	\$ (339,415)	\$ (681,330)	\$ (1,020,745)	\$ (1,020,745)	\$ 656,387
5. Funded Ratio (FV Basis)				100.0 %	100.0 %

## Comments and Conclusion

**The December 31, 2019 actuarial valuations of members indicate** the following about the portion of employer contribution rates allocated to financing retirement allowances:

- The employer rates, when combined with the member rates, are sufficient to fully fund the cost of benefit commitments being made to members for service currently being rendered (i.e. normal cost)
- After satisfying normal cost requirements, the remaining portion of the employer rates provides sufficient funds to amortize unfunded actuarial accrued liabilities over a period of 23 years for the System in total.

**Experience.** The computed amortization period, taking into account all scheduled increases in contribution rates (currently none), is 23 years compared with the 27-year period that had been reported in the December 31, 2018 valuation. In aggregate, experience was more favorable than expectations during the 2019 calendar year. Primary factors which typically would contribute to changes in the amortization years were:

- Measured on a market value basis, investment return was 17.08%. This figure is based upon an actuarial calculation and may not agree with figures reported elsewhere. The return on the funding value was 9.11%. The funding rate of return was lower than the market rate of return due to the four year smoothing of gains and losses. Since the return on funding value of assets was higher than the 7.20% assumed return, there was downward pressure on the computed amortization period.
- The number of members who left active membership as a result of retirement, disability, and death-in-service was less than expected during calendar year 2019 resulting in an overall liability gain, placing downward pressure on the computed amortization period.
- Retirees who retired after 1/7/2013 receive a 1.40% Cost-of-Living Adjustment (COLA) for the calendar year 2020, which is lower than the 2.15% COLA increase assumption. This resulted in a liability gain, placing downward pressure on the computed amortization period.

Information concerning 2019 experience including other sources of gains and losses is presented on pages I-15 through I-18.

**Conclusion.** Based on the results of the December 31, 2019 regular annual actuarial valuation, it is our opinion that the Ohio Public Employees Retirement System continues to operate in accordance with actuarial principles of level percent of payroll financing.

## Other Observations

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.20% on the funding value of assets), it is expected that:

- (1) The employer normal cost as a percentage of pay will decrease to the level of the Group C normal cost as time passes as the majority of the active population is comprised of Group C members,
- (2) The unfunded actuarial accrued liabilities will be fully amortized after 23 years, and
- (3) The funded status of the plan will increase gradually towards a 100% funded ratio.

When selecting a contribution allocation procedure, the following three items should be considered, including the balance amongst the three items: (1) benefit security, (2) intergenerational equity, and (3) contribution stability and predictability. Generally, given the nature of public employee retirement systems (e.g., level contribution financing objective and perceived ongoing nature of the plan or plan sponsor), intergenerational equity and contribution stability and predictability have received more consideration than benefit security when contribution allocation procedures are selected. However, given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

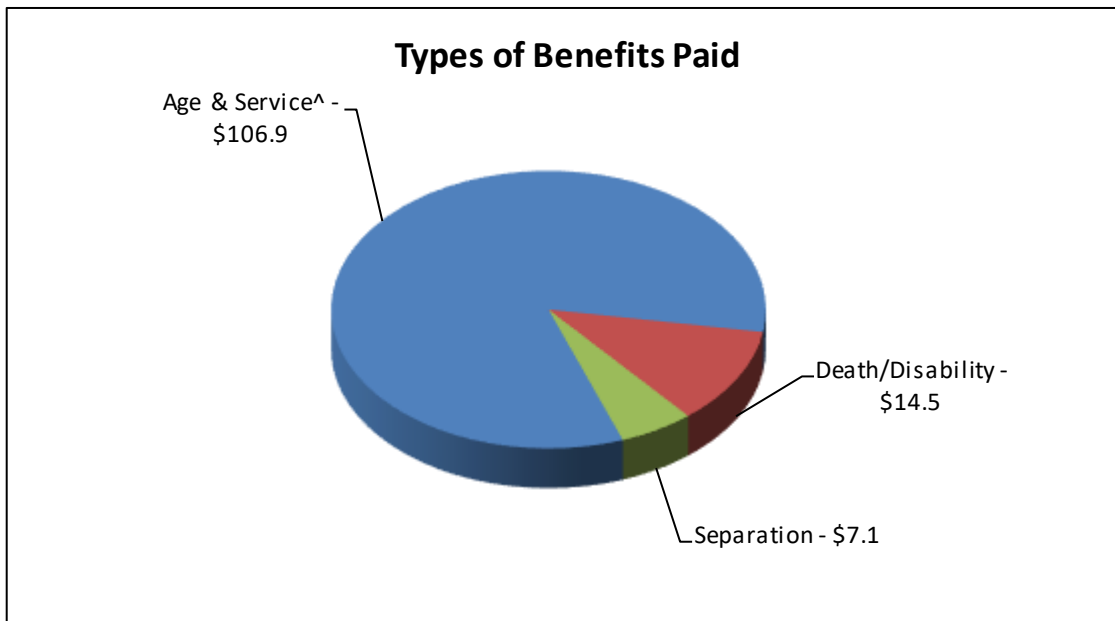
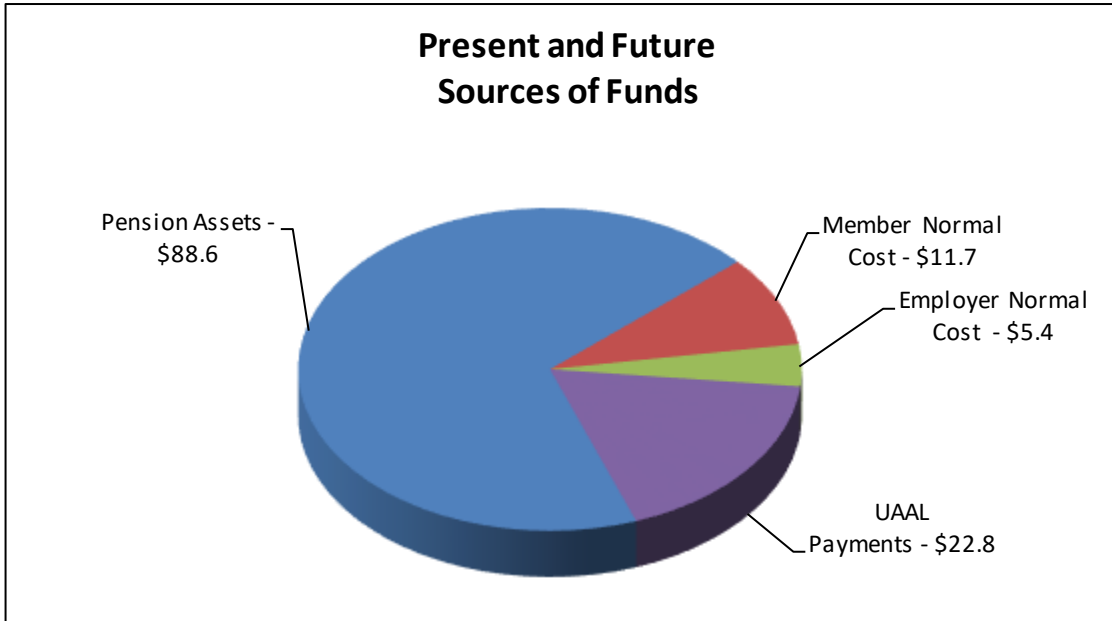
This valuation assumes the continuing ability of the employers to make the contributions necessary to fund the System. A determination regarding whether or not the employers are actually able to do so is outside our scope of expertise and was not performed.

### Limitations of Funded Status Measurements

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

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, for transferring the obligations to an unrelated third party (e.g., insurance company) in a market value type transaction. In addition, the measurement is inappropriate for assessing benefit security for the membership.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the funding value of assets, unless the market value of assets is used in the measurement.

# Financing \$128.5 Billion\* of Defined Benefit Promises for Present Active and Retired Members December 31, 2019 (Dollar Amounts in Billions)



\* Present value of future benefits – all divisions combined.

<sup>^</sup> Includes administrative expenses.

# Defined Benefit Active Members in Valuation Group Averages - Comparative Statement

Valuation Group	Dec. 31	No. of Active Members	Group Averages				
			Attained Age	Accrued Service Yrs.	Annual Payroll		
					Average	Increase	
STATE	1975	83,220	40.6 yrs.	6.5 yrs.	\$ 9,441	6.4 %	@
	1980	92,872	39.4	7.3	13,934	8.1 %	@
	1985	89,256	39.2	8.4	18,677	6.0 %	@
	1990	98,939	40.7	8.1	25,281	6.2 %	@
	1995	114,596	40.4	8.8	27,962	2.0 %	@
	2000	113,099	41.6	9.7	34,201	4.1 %	@
	2005	114,620	42.0	10.1	37,858	2.1 %	@
	2010	118,240	41.0	9.6	40,691	1.5 %	@
	2015	118,372	39.9	8.9	41,911	0.6 %	@
	2016	119,223	39.8	8.8	43,037	2.7 %	
	2017	121,199	39.5	8.6	43,610	1.3 %	
2018	102,165	42.0	10.0	50,795	16.5 %	#	
2019	103,162	41.9	10.0	52,101	2.6 %		
LOCAL GOV'T	1975	149,557	40.8 yrs.	6.1 yrs.	8,771	4.3 %	@
	1980	160,797	40.7	7.4	13,035	8.2 %	@
	1985	158,285	40.1	8.3	15,983	4.2 %	@
	1990	173,220	41.5	7.9	19,506	4.1 %	@
	1995	223,431	41.2	7.6	20,384	0.9 %	@
	2000	245,831	41.8	8.1	24,401	3.7 %	@
	2005	236,073	43.3	9.2	29,933	4.2 %	@
	2010	215,144	44.6	10.1	33,447	2.2 %	@
	2015	202,779	44.4	10.0	37,008	2.0 %	@
	2016	203,767	44.4	9.9	38,279	3.4 %	
	2017	201,953	44.4	9.9	39,263	2.6 %	
2018	182,306	46.2	10.7	42,984	9.5 %	#	
2019	182,109	46.2	10.7	44,067	2.5 %		
LAW * (Includes Public Safety and Law Enforcement)	1975	2,111	35.0 yrs.	4.9 yrs.	10,467	-	
	1980	3,019	36.1	6.8	16,846	10.0 %	@
	1985	4,207	36.5	8.4	20,103	3.6 %	@
	1990	5,804	38.6	9.9	26,936	6.0 %	@
	1995	6,605	39.3	11.1	32,441	3.8 %	@
	2000	8,045	39.3	11.7	40,387	4.5 %	@
	2005	8,111	39.9	12.6	49,472	4.1 %	@
	2010	7,790	41.2	14.0	56,801	2.8 %	@
	2015	7,858	41.3	14.2	61,710	1.7 %	@
	2016	7,992	41.4	14.3	64,422	4.4 %	
	2017	8,114	41.2	14.1	65,522	1.7 %	
2018	8,076	41.3	14.3	67,689	3.3 %	#	
2019	8,121	41.5	14.5	69,857	3.2 %		
TOTAL	2005	358,804	42.8 yrs.	9.5 yrs.	32,906	3.5 %	@
	2010	341,174	43.3	10.0	36,491	2.1 %	@
	2015	329,009	42.7	9.7	39,362	1.5 %	@
	2016	330,982	42.7	9.6	40,624	3.2 %	
	2017	331,266	42.6	9.5	41,497	2.1 %	
	2018	292,547	44.6	10.6	46,394	11.8 %	#
	2019	293,392	44.6	10.5	47,606	2.6 %	

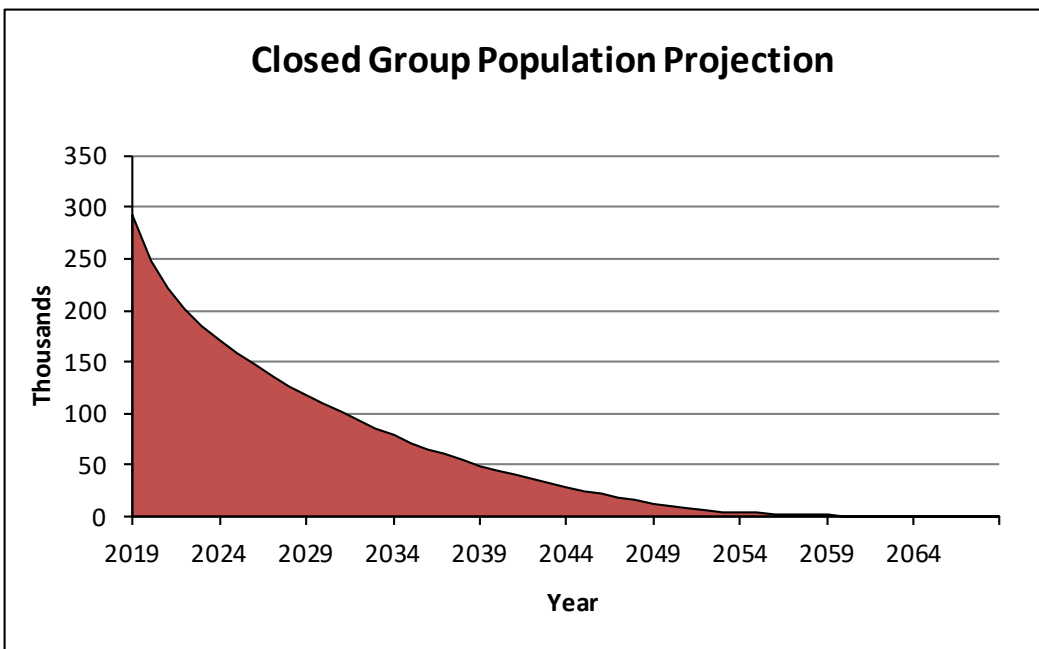
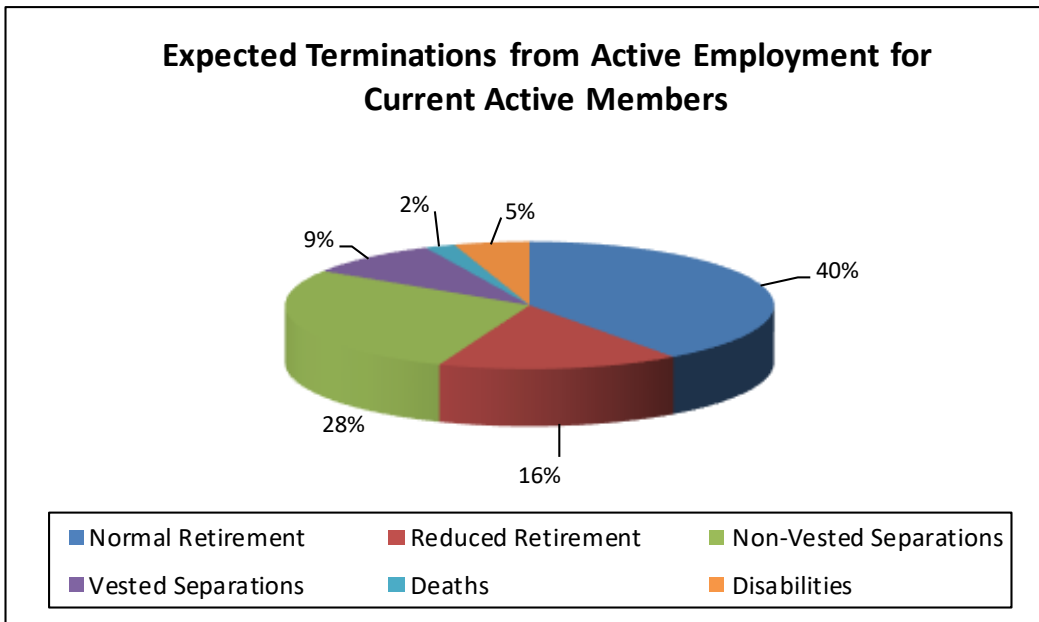
@ 5-year annual compound rate.

\* Beginning with the December 31, 2005 valuation report, valuation results for the Law division are shown separately for Public Safety and Law Enforcement.

# Reflects approximately 30,000 to 40,000 actives members reclassified as inactive.



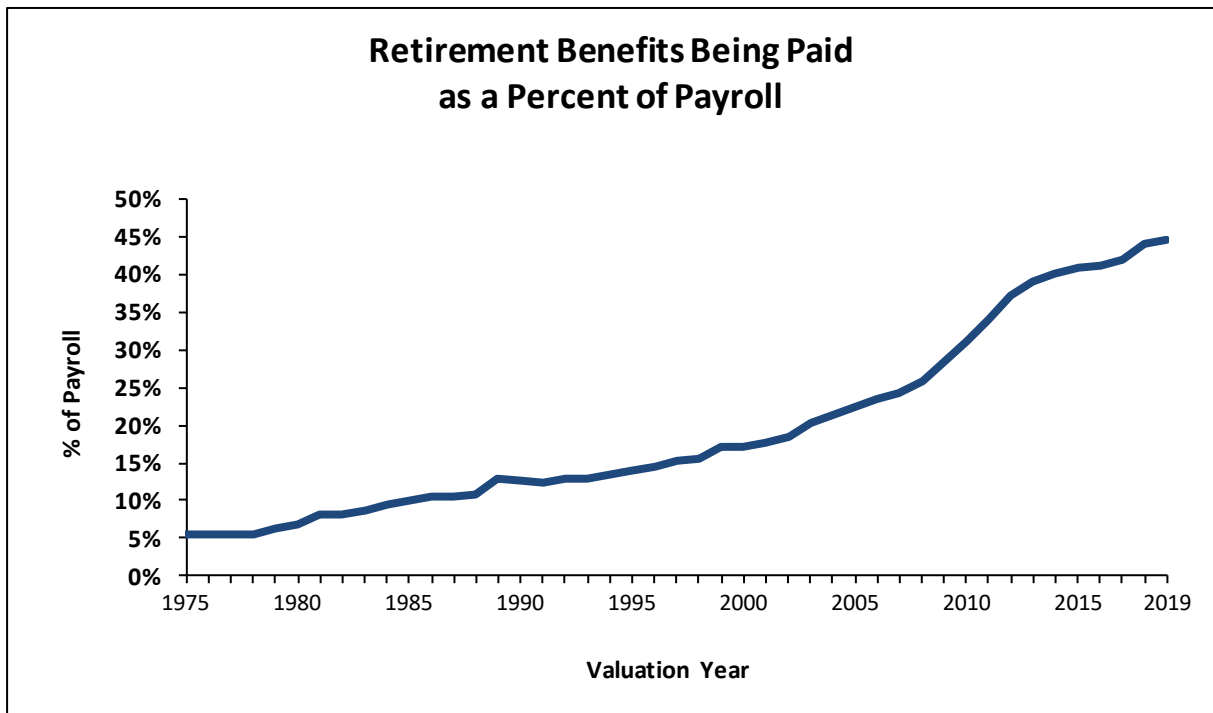
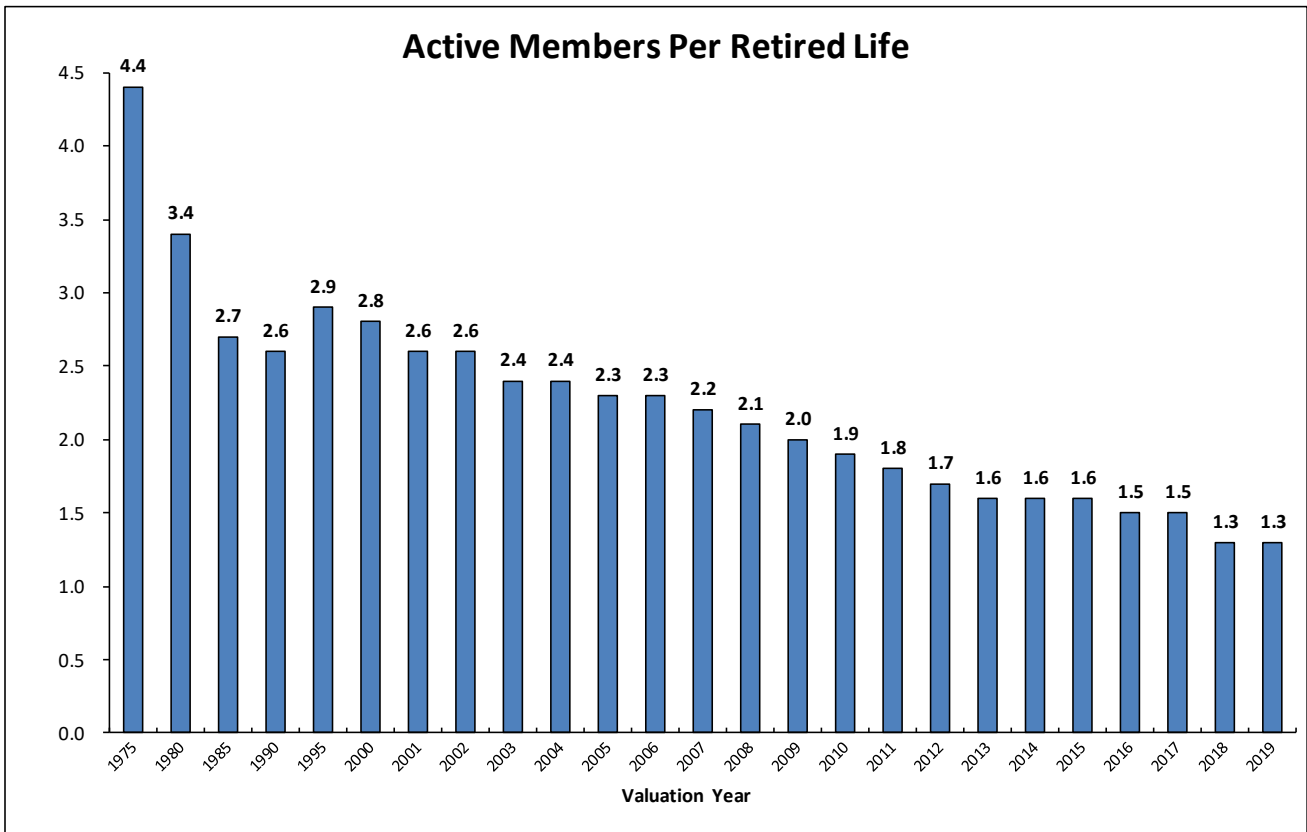
## Development of Present Defined Benefit Population December 31, 2019



The charts above show the expected future development of the present population in simplified terms. The defined benefit portion of the Retirement System presently covers 293,392 active members. Eventually, 28% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for a monthly benefit. 65% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service without withdrawing contributions. 7% of the present population is expected to become eligible for death-in-service or disability benefits. Within 8 years, over half of the covered membership is expected to consist of new hires.

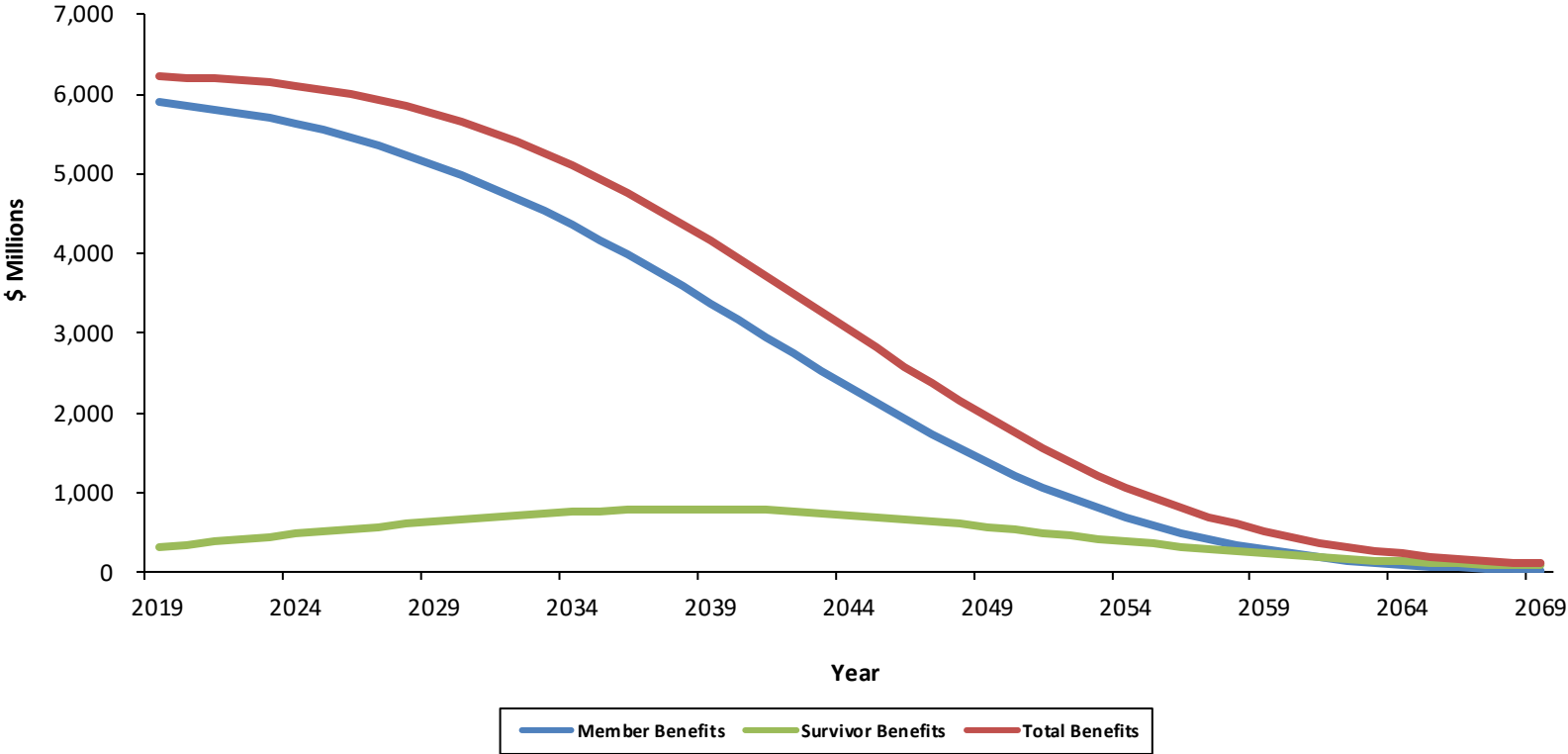
# Active/Retired Member Statistics

## December 31, 2019





# Projected Future Benefit Payments on Behalf of Present Retired Lives



Total future payments:	\$159.6 billion
From present assets:	\$ 70.1 billion
From future earnings:	\$ 89.5 billion

**All Divisions**  
**Defined Benefit Active Members in Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	5,787							5,787
Tot. Pay	\$57,736,064							\$57,736,064
Avg. Pay	\$9,977							\$9,977
20-24	21,584	168						21,752
Tot. Pay	\$428,948,198	\$5,747,914						\$434,696,112
Avg. Pay	\$19,873	\$34,214						\$19,984
25-29	21,760	3,975	95					25,830
Tot. Pay	\$789,570,817	\$186,594,859	\$4,259,315					\$980,424,991
Avg. Pay	\$36,285	\$46,942	\$44,835					\$37,957
30-34	16,384	9,407	2,494	125				28,410
Tot. Pay	\$654,716,968	\$499,293,617	\$140,903,964	\$6,690,069				\$1,301,604,618
Avg. Pay	\$39,961	\$53,077	\$56,497	\$53,521				\$45,815
35-39	12,036	7,384	6,532	2,777	175			28,904
Tot. Pay	\$483,181,655	\$398,172,144	\$393,928,618	\$170,722,174	\$9,592,639			\$1,455,597,230
Avg. Pay	\$40,145	\$53,924	\$60,308	\$61,477	\$54,815			\$50,360
40-44	9,715	5,554	5,384	6,232	2,827	111		29,823
Tot. Pay	\$385,826,401	\$296,679,060	\$326,926,688	\$407,425,755	\$184,370,510	\$6,867,818		\$1,608,096,232
Avg. Pay	\$39,715	\$53,417	\$60,722	\$65,376	\$65,218	\$61,872		\$53,921
45-49	9,200	5,193	4,781	5,468	6,821	2,667	102	34,232
Tot. Pay	\$353,295,970	\$274,536,378	\$284,699,560	\$352,980,404	\$464,218,156	\$184,778,175	\$6,704,094	\$1,921,212,737
Avg. Pay	\$38,402	\$52,867	\$59,548	\$64,554	\$68,057	\$69,283	\$65,726	\$56,123
50-54	7,829	4,743	4,527	5,073	5,913	6,333	2,074	36,492
Tot. Pay	\$287,874,445	\$240,601,822	\$252,215,308	\$313,571,813	\$394,720,904	\$461,089,581	\$146,563,721	\$2,096,637,594
Avg. Pay	\$36,770	\$50,728	\$55,714	\$61,812	\$66,755	\$72,807	\$70,667	\$57,455
55-59	6,555	4,290	4,409	5,022	5,510	5,475	4,049	35,310
Tot. Pay	\$224,950,909	\$205,770,320	\$229,013,885	\$287,147,227	\$338,023,795	\$369,571,285	\$299,566,476	\$1,954,043,897
Avg. Pay	\$34,317	\$47,965	\$51,942	\$57,178	\$61,347	\$67,502	\$73,985	\$55,340
60-64	4,997	3,368	3,548	4,307	4,546	3,935	2,929	27,630
Tot. Pay	\$142,908,054	\$148,519,100	\$176,254,927	\$230,424,508	\$265,252,314	\$252,961,568	\$210,070,529	\$1,426,391,000
Avg. Pay	\$28,599	\$44,097	\$49,677	\$53,500	\$58,349	\$64,285	\$71,721	\$51,625
65-69	3,031	1,573	1,552	1,747	1,626	1,459	1,295	12,283
Tot. Pay	\$58,620,924	\$58,880,529	\$70,928,914	\$89,681,812	\$90,511,345	\$86,607,619	\$91,268,152	\$546,499,295
Avg. Pay	\$19,340	\$37,432	\$45,702	\$51,335	\$55,665	\$59,361	\$70,477	\$44,492
70 & Over	2,775	1,115	794	668	559	446	582	6,939
Tot. Pay	\$36,024,320	\$21,505,519	\$21,666,643	\$23,919,117	\$24,027,246	\$22,310,850	\$34,774,861	\$184,228,556
Avg. Pay	\$12,982	\$19,287	\$27,288	\$35,807	\$42,983	\$50,024	\$59,751	\$26,550
<b>Totals</b>	121,653	46,770	34,116	31,419	27,977	20,426	11,031	293,392
<b>Tot. Pay</b>	\$3,903,654,725	\$2,336,301,262	\$1,900,797,822	\$1,882,562,879	\$1,770,716,909	\$1,384,186,896	\$788,947,833	\$13,967,168,326
<b>Avg. Pay</b>	\$32,088	\$49,953	\$55,716	\$59,918	\$63,292	\$67,766	\$71,521	\$47,606

**All Divisions**  
**Defined Benefit Active Members in Valuation**  
**December 31, 2019**  
**by Gender and Years of Service**

Service Years	Active Member Count			Active Member Pays	
	Males	Females	Total	Total	Average
0	20,390	24,894	45,284	\$ 989,767,439	\$21,857
1	11,762	14,165	25,927	843,307,468	32,526
2	8,930	10,875	19,805	752,773,922	38,009
3	7,272	9,215	16,487	692,945,096	42,030
4	6,311	7,839	14,150	624,860,800	44,160
5	5,574	6,254	11,828	553,435,729	46,790
6	5,074	5,766	10,840	525,793,913	48,505
7	4,351	5,173	9,524	486,118,524	51,041
8	3,818	3,910	7,728	402,515,280	52,085
9	3,273	3,577	6,850	368,437,816	53,787
10	2,805	2,739	5,544	299,132,643	53,956
11	2,948	3,645	6,593	357,856,195	54,278
12	3,522	4,019	7,541	415,970,005	55,161
13	3,523	4,027	7,550	432,395,009	57,271
14	3,170	3,718	6,888	395,443,970	57,411
15 & Up	43,797	47,056	90,853	5,826,414,517	64,130
<b>Totals</b>	<b>136,520</b>	<b>156,872</b>	<b>293,392</b>	<b>\$ 13,967,168,326</b>	<b>\$47,606</b>

## Summary of Pension Experience Traditional, Combined, and Member Directed Plans (\$ in Millions)

	2019		2018	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Actuarial Accrued Liabilities	\$108,704.61	100.00 %	\$106,089.67	100.00 %
2. Valuation Assets	84,286.99	77.54 %	83,292.23	78.51 %
3. Unfunded Actuarial Accrued Liabilities	\$24,417.62	22.46 %	\$22,797.44	21.49 %
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$194.31	0.18 %	\$186.40	0.18 %
b. Investment return	1,576.17	1.45 %	(1,752.98)	(1.65)%
c. Total	\$1,770.48	1.63 %	\$(1,566.58)	(1.47)%
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$16.84	0.02 %	\$51.22	0.05 %
b. Disability retirement	101.09	0.09 %	83.89	0.08 %
c. Death-in-service	35.78	0.03 %	46.45	0.04 %
d. Other separations	14.55	0.01 %	31.10	0.03 %
e. Total	\$168.26	0.15 %	\$212.66	0.20 %
6. Gains (losses) from retiree COLA experience	\$108.22	0.10 %	\$(104.80)	(0.10)%
7. Gains (losses) from retiree mortality	\$12.24	0.01 %	\$122.07	0.12 %
<b>8. Total experience gains (losses): (4c) + (5e) + (6) + (7)</b>	<b>\$2,059.20</b>	<b>1.89 %</b>	<b>\$(1,336.65)</b>	<b>(1.25)%</b>
<b>End of Year</b>				
9. Total Actuarial Accrued Liabilities	\$111,371.30	100.00 %	\$108,704.61	100.00 %
10. Valuation Assets	88,571.72	79.53 %	84,286.99	77.54 %
11. Unfunded Actuarial Accrued Liabilities	\$22,799.58	20.47 %	\$24,417.62	22.46 %

## Summary of Pension Experience Traditional Plan (\$ in Millions)

	2019		2018	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Actuarial Accrued Liabilities	\$108,264.57	100.00 %	\$105,690.89	100.00 %
2. Valuation Assets	83,715.40	77.32 %	82,796.83	78.34 %
3. Unfunded Actuarial Accrued Liabilities	\$24,549.17	22.68 %	\$22,894.06	21.66 %
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$189.67	0.18 %	\$182.98	0.17 %
b. Investment return	1,565.84	1.45 %	(1,743.51)	(1.65)%
c. Total	\$1,755.51	1.63 %	\$(1,560.53)	(1.48)%
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$16.92	0.02 %	\$51.17	0.05 %
b. Disability retirement	95.20	0.09 %	79.58	0.08 %
c. Death-in-service	35.20	0.03 %	45.91	0.04 %
d. Other separations	14.08	0.01 %	31.14	0.03 %
e. Total	\$161.40	0.15 %	\$207.80	0.20 %
6. Gains (losses) from retiree COLA experience	\$107.95	0.10 %	\$(104.61)	(0.10)%
7. Gains (losses) from retiree mortality	\$12.29	0.01 %	\$121.82	0.12 %
<b>8. Total experience gains (losses): (4c) + (5e) + (6) + (7)</b>	<b>\$2,037.15</b>	<b>1.89 %</b>	<b>\$(1,335.52)</b>	<b>(1.26)%</b>
<b>End of Year</b>				
9. Total Actuarial Accrued Liabilities	\$110,887.29	100.00 %	\$108,264.57	100.00 %
10. Valuation Assets	87,902.87	79.27 %	83,715.40	77.32 %
11. Unfunded Actuarial Accrued Liabilities	\$22,984.42	20.73 %	\$24,549.17	22.68 %

## Summary of Pension Experience Combined Plan (\$ in Millions)

	2019		2018	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Actuarial Accrued Liabilities	\$420.12	100.00 %	\$382.01	100.00 %
2. Valuation Assets	551.67	131.31 %	478.63	125.29 %
3. Unfunded Actuarial Accrued Liabilities	\$(131.55)	(31.31)%	\$(96.62)	(25.29)%
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$4.64	1.11 %	\$3.42	0.90 %
b. Investment return	9.88	2.35 %	(9.22)	(2.41)%
c. Total	\$14.52	3.46 %	\$(5.80)	(1.51)%
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$(0.07)	(0.02)%	\$0.05	0.01 %
b. Disability retirement	5.89	1.40 %	4.32	1.13 %
c. Death-in-service	0.58	0.14 %	0.53	0.14 %
d. Other separations	0.46	0.11 %	(0.04)	(0.01)%
e. Total	\$6.86	1.63 %	\$4.86	1.27 %
6. Gains (losses) from retiree COLA experience	\$0.17	0.04 %	\$(0.12)	(0.03)%
7. Gains (losses) from retiree mortality	\$(0.17)	(0.04)%	\$0.16	0.04 %
<b>8. Total experience gains (losses): (4c) + (5e) + (6) + (7)</b>	<b>\$21.38</b>	<b>5.09 %</b>	<b>\$(0.90)</b>	<b>(0.23)%</b>
<b>End of Year</b>				
9. Total Actuarial Accrued Liabilities	\$461.19	100.00 %	\$420.12	100.00 %
10. Valuation Assets	646.03	140.08 %	551.67	131.31 %
11. Unfunded Actuarial Accrued Liabilities	\$(184.84)	(40.08)%	\$(131.55)	(31.31)%

## Summary of Pension Experience Member Directed Plan (\$ in Millions)

	2019		2018	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
<b>Beginning of Year</b>				
1. Total Actuarial Accrued Liabilities	\$19.92	100.00 %	\$16.77	100.00 %
2. Valuation Assets	19.92	100.00 %	16.77	100.00 %
3. Unfunded Actuarial Accrued Liabilities	\$0.00	0.00 %	\$0.00	0.00 %
<b>Experience Gains (Losses)</b>				
4. Gains (losses) in economic risk areas				
a. Pay increases				
b. Investment return	\$0.45	2.26 %	\$(0.25)	(1.49)%
c. Total	\$0.45	2.26 %	\$(0.25)	(1.49)%
5. Gains (losses) from active member decrement experience				
a. Service retirement				
b. Disability retirement				
c. Death-in-service				
d. Other separations				
e. Total	N/A	N/A	N/A	N/A
6. Gains (losses) from retiree COLA experience	\$0.09	0.45 %	\$(0.07)	(0.42)%
7. Gains (losses) from retiree mortality	\$0.13	0.65 %	\$0.10	0.60 %
<b>8. Total experience gains (losses): (4c) + (5e) + (6) + (7)</b>	<b>\$0.67</b>	<b>3.36 %</b>	<b>\$(0.22)</b>	<b>(1.31)%</b>
<b>End of Year</b>				
9. Total Actuarial Accrued Liabilities	\$22.82	100.00 %	\$19.92	100.00 %
10. Valuation Assets	22.82	100.00 %	19.92	100.00 %
11. Unfunded Actuarial Accrued Liabilities	\$0.00	0.00 %	\$0.00	0.00 %

## Risk Commentary

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

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

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

- (1) **Investment Risk** – The risk that actual investment returns may differ from the expected investment returns. For OPERS, this risk is enhanced since members of OPERS do not participate in Social Security resulting in a larger asset base.
- (2) **Contribution Risk** – OPERS is a plan that has fixed maximum employer and employee contribution rates in the Revised Code of Ohio. The Board may establish employer and employee contribution rates up to the maximums. Currently, OPERS is at the maximum employer and employee contributions rates. In addition, the Board makes the determination of how much of the contributions are allocated to the pension and retiree health portions of OPERS. Currently, all of the contributions are allocated to the pension program. Contribution risk is the risk that the current level of contributions may be insufficient to fund the current pension benefit structure of OPERS while maintaining the Revised Code of Ohio requirement of an amortization period of no greater than 30 years.
- (3) **Participation Risk** – The risk that a significant portion of the active population participates in the Member Directed Plan as opposed to the Traditional Plan. This would reduce contribution income to the Traditional Plan and increase the risk that scheduled contributions would be insufficient to provide scheduled benefits.

Plan maturity measures are presented on pages I-11 and I-20 of this section.



# Summary of Risk/Maturity Measures

## Traditional Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2010	79 %	79 %	25	1.4	5.2	6.6	56 %
2011	77	73	30	1.6	5.4	7.0	57
2012	81	81	26	1.3	5.7	7.0	74
2013	82	86	25	1.3	5.9	7.2	80
2014	84	86	21	1.2	6.1	7.2	83
2015	80	77	20	1.5	6.2	7.7	83
2016	80	77	20	1.5	6.1	7.7	72
2017	81	85	19	1.5	6.2	7.7	78
2018	77	75	28	1.9	6.4	8.2	75
2019	79	82	23	1.7	6.5	8.2	82

## Combined Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2010	76 %	75 %	3	0.2	0.5	0.6	5 %
2011	79	75	2	0.1	0.5	0.7	6
2012	86	87	1	0.1	0.6	0.7	8
2013	100	105	0	0.0	0.7	0.7	9
2014	111	115	0	-0.1	0.8	0.7	11
2015	116	111	0	-0.1	0.9	0.8	13
2016	120	117	0	-0.2	1.0	0.8	12
2017	131	137	0	-0.3	1.1	0.9	14
2018	131	127	0	-0.3	1.3	1.0	15
2019	140	145	0	-0.4	1.5	1.1	19

## DB Portion of Member Directed Plan

Valuation Year	Funded Ratio		UAAL	UAAL / Total Payroll	Funding Value	Total AAL / Total Payroll	Standard Deviation of
	Based on FVA	Based on MVA	Amortization Period		of Assets / Total Payroll		Investment Return / Total Payroll
2010	92 %	92 %	N/A	0.0	0.0	0.0	N/A
2011	99	95	N/A	0.0	0.0	0.0	N/A
2012	95	97	N/A	0.0	0.0	0.0	N/A
2013	99	103	N/A	0.0	0.0	0.0	N/A
2014	106	107	N/A	0.0	0.0	0.0	N/A
2015	103	99	N/A	0.0	0.0	0.0	N/A
2016	100	98	N/A	0.0	0.0	0.0	N/A
2017	100	106	N/A	0.0	0.0	0.0	N/A
2018	100	97	N/A	0.0	0.0	0.0	N/A
2019	100	104	N/A	0.0	0.0	0.0	N/A

## Summary of Risk/Maturity Measures (Concluded)

An explanation of the significance of the risk metrics presented on the preceding page follows:

- (1) **Funded Ratio (Funding Value of Assets basis)** – This is the most widely known measure of a plan's financial strength. The trend in the funded ratio is much more important than the absolute ratio. A trend approaching 100% is desirable.
- (2) **Funded Ratio (Market Value of Assets basis)** – This is similar to the above, except that the asset value used is the market value.
- (3) **UAAL Amortization Period** – Periods above 17 to 20 years indicate that the UAAL payment is less than the interest on the UAAL. This situation is referred to as “negative amortization.” Negative amortization is increasingly viewed as undesirable.
- (4) **UAAL / Total Payroll** – The ratio of UAAL to payroll gives an indication of the plan sponsor's ability to pay off the UAAL. A declining ratio is desirable. A ratio above approximately 3.0 or 4.0 may indicate difficulty in discharging the unfunded liability in some circumstances.
- (5) **Funding Value of Assets / Total Payroll** – The ratio of assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5.0 and 7.0. Social Security Replacement Plans may fall above that range. A high ratio can indicate volatility of contribution rates or amortization period.
- (6) **Total AAL / Total Payroll** – This is similar to above. It illustrates the expected ratio of assets to payroll when the plan has a funded ratio of 100%.
- (7) **Standard Deviation of Investment Return / Total Payroll** – The portfolio standard deviation measures the volatility of investment return. When divided by payroll it gives the effect of a one standard deviation asset gain or loss as a percent of payroll. This theoretically may happen once every 6 years.

## **SECTION II**

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### **FINANCIAL INFORMATION**

# Financial Data for Calendar Year 2019

## Consolidated Asset Reconciliation

### All Plans, All Divisions

	Traditional Pension Plan	DB Portion of Combined Pension Plan	DB Portion of Member-Directed Plan	2019 Total Defined Pension Benefit	Total Health Care	DC Portion of Combined Pension Plan	DC Portion of Member Directed	2019 Total Defined Contribution	Total 2019
Beginning Market Value @ 12/31/18									
Assets Held in Trust for Benefits	\$ 80,751,838,695	\$ 531,478,928	\$ 19,259,607	\$ 81,302,577,230	\$ 11,252,985,701	\$ 504,589,613	\$ 958,116,464	\$ 1,462,706,077	\$ 94,018,269,008
Gain/Loss on Security Lending	2,767,088	21,419	822	2,789,329	-	-	-	-	2,789,329
Rounding	-	-	-	-	-	-	-	-	-
Assets Held for Upcoming Year Budget	121,999,445	-	-	121,999,445	-	-	-	-	121,999,445
<b>Total Beginning Market Value @ 1/1/2019</b>	<b>80,876,605,054</b>	<b>531,500,579</b>	<b>19,260,428</b>	<b>81,427,366,061</b>	<b>11,252,985,701</b>	<b>504,589,613</b>	<b>958,116,464</b>	<b>1,462,706,077</b>	<b>94,143,057,839</b>
<b>External Cash Flows:</b>									
Revenues:									
Member Contributions / Deposits	1,410,501,971	-	-	1,410,501,971	-	44,786,688	60,789,282	105,575,970	1,516,077,941
Employer Contributions	1,974,172,176	62,699,159	-	2,036,871,335	24,318,141	-	60,407,234	60,407,234	2,121,596,710
Employer Contributions - Administrative Expenses	-	-	385,688	385,688	-	-	-	-	385,688
Contract and Other Receipts	66,023,563	137,162	-	66,160,725	540,809	153,946	646,566	800,512	67,502,046
Refund from HC Vendors (Guarantees)	-	-	-	-	210,056	-	-	-	210,056
Other Income / Cancelled Warrants	694,862	-	-	694,862	(208,332)	-	-	-	486,530
<b>Total Revenues</b>	<b>3,451,392,572</b>	<b>62,836,321</b>	<b>385,688</b>	<b>3,514,614,581</b>	<b>24,860,674</b>	<b>44,940,634</b>	<b>121,843,082</b>	<b>166,783,716</b>	<b>3,706,258,971</b>
Disbursements:									
Refunds of Member Accounts	(407,308,374)	(4,148,960)	(1,355,424)	(412,812,758)	-	(13,382,763)	(46,409,167)	(59,791,930)	(472,604,688)
Retirement Benefits	(6,310,936,996)	(3,184,930)	(1,588,432)	(6,315,710,358)	-	(2,125,957)	(894,937)	(3,020,894)	(6,318,731,252)
Health Care Expenses	-	-	-	-	(587,979,599)	-	-	-	(587,979,599)
Retiree-Paid Health Care & Formulary Rebates	-	-	-	-	250,874,320	-	-	-	250,874,320
Federal Subsidies	-	-	-	-	357,047	-	-	-	357,047
ER Paid PCORI	-	-	-	-	(432,518)	-	-	-	(432,518)
ER Paid Medicare	-	-	-	-	(27,592,178)	-	-	-	(27,592,178)
Wellness RMA Claims	-	-	-	-	(152,951)	-	-	-	(152,951)
MD-RMA Claims	-	-	-	-	(4,687,902)	-	-	-	(4,687,902)
HRA Claims	-	-	-	-	(398,275,148)	-	-	-	(398,275,148)
Non-Investment Related Expenses	(51,899,317)	-	-	(51,899,317)	(17,957,667)	(3,906,211)	(2,395,830)	(6,302,041)	(76,159,025)
Investment Administrative Expense	(37,048,483)	-	-	(37,048,483)	(5,552,500)	(434,437)	(405,305)	(839,742)	(43,440,725)
<b>Total Disbursements</b>	<b>(6,807,193,170)</b>	<b>(7,333,890)</b>	<b>(2,943,856)</b>	<b>(6,817,470,916)</b>	<b>(791,399,096)</b>	<b>(19,849,368)</b>	<b>(50,105,239)</b>	<b>(69,954,607)</b>	<b>(7,678,824,619)</b>
<b>Net External Cash Flow</b>	<b>(3,355,800,598)</b>	<b>55,502,431</b>	<b>(2,558,168)</b>	<b>(3,302,856,335)</b>	<b>(766,538,422)</b>	<b>25,091,266</b>	<b>71,737,843</b>	<b>96,829,109</b>	<b>(3,972,565,648)</b>
<b>Inter-Plan Activity</b>									
Member Balance Transfers & Plan Switches	5,476,355	(2,777,070)	1	2,699,286	-	(723,466)	(1,975,877)	(2,699,343)	(57)
Mitigation Rate	25,743,437	(10,915,034)	-	14,828,403	-	-	(14,828,403)	(14,828,403)	-
Intraplan Transfer (DC to DB)	-	1,395,962	3,542,528	4,938,490	-	(1,395,962)	(3,542,528)	(4,938,490)	-
<b>Total Inter-Plan Activity</b>	<b>31,219,792</b>	<b>(12,296,142)</b>	<b>3,542,529</b>	<b>22,466,179</b>	<b>-</b>	<b>(2,119,428)</b>	<b>(20,346,808)</b>	<b>(22,466,236)</b>	<b>(57)</b>
<b>Investment (Income) Loss:</b>									
Gross Investment (Income) Loss	14,084,681,445	97,985,978	3,734,783	14,186,402,206	2,193,906,480	109,155,465	207,479,586	316,635,051	16,696,943,737
Unrealized (Income) Loss on Security Lending	(509,691)	(5,715)	(223)	(515,629)	-	-	-	-	(515,629)
External Asset Management Fees	(514,586,284)	(3,603,181)	(137,337)	(518,326,802)	(33,296,008)	(127,679)	(244,082)	(371,761)	(551,994,571)
<b>Net Investment Income</b>	<b>13,569,585,470</b>	<b>94,377,082</b>	<b>3,597,223</b>	<b>13,667,559,775</b>	<b>2,160,610,472</b>	<b>109,027,786</b>	<b>207,235,504</b>	<b>316,263,290</b>	<b>16,144,433,537</b>
<b>Ending Market Value @ 12/31/19</b>	<b>91,121,609,718</b>	<b>669,083,950</b>	<b>23,842,012</b>	<b>91,814,535,680</b>	<b>12,647,057,751</b>	<b>636,589,237</b>	<b>1,216,743,003</b>	<b>1,853,332,240</b>	<b>106,314,925,671</b>



## Development of Funding Value of Pension Defined Benefit Assets Traditional, Combined, and Member Directed Plans

Year Ended December 31	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 83,292,231,053	\$ 84,286,985,336			
B. Market Value End of Year	81,427,366,061	91,814,535,680			
C. Market Value Beginning of Year	87,104,861,916	81,427,366,061			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	1,354,235,298	1,410,501,971			
D2. Employer and other Non-Member Contributions	2,052,209,140	2,118,941,013			
D3. Refund of Member Accounts	(393,078,563)	(412,812,758)			
D4. Retirement Benefits	(6,105,298,134)	(6,315,710,358)			
D5. Member Balance Transfers / Intraplan Transfers / Other	7,323,834	7,637,776			
D6. Admin Expenses	(51,791,090)	(51,899,317)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,136,399,515)	(3,243,341,673)			
E. Investment Return					
E1. Market Total: B-C-D7	(2,541,096,340)	13,630,511,292			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	5,884,130,253	5,951,902,644			
E4. Amount Subject to Phase-In: E1-E3	(8,425,226,593)	7,678,608,648			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	(2,106,306,648)	1,919,652,162			
F2. First Prior Year	1,696,475,373	(2,106,306,648)	\$ 1,919,652,162		
F3. Second Prior Year	66,349,925	1,696,475,373	(2,106,306,648)	\$ 1,919,652,162	
F4. Third Prior Year	(1,409,495,105)	66,349,923	1,696,475,374	(2,106,306,649)	\$ 1,919,652,162
F5. Total Phase-Ins	(1,752,976,455)	1,576,170,810	1,509,820,888	(186,654,487)	1,919,652,162
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 84,286,985,336	\$ 88,571,717,117			
G2. Upper Corridor Limit: 112% x B	91,198,649,987	102,832,279,961			
G3. Lower Corridor Limit: 88% x B	71,656,082,135	80,796,791,399			
G4. Funding Value End of Year	\$ 84,286,985,336	\$ 88,571,717,117			
H. Difference Between Market and Funding Value	(2,859,619,275)	3,242,818,563	1,732,997,675	1,919,652,162	-
I. Recognized Rate of Return	5.06 %	9.11 %			
J. Market Rate of Return	(2.97)%	17.08 %			
K. Ratio of Funding Value to Market Value	104 %	96 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

## Development of Funding Value of Pension Defined Benefit Assets Traditional Plan

Year Ended December 31	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 82,796,832,824	\$ 83,715,397,357			
B. Market Value End of Year	80,876,605,054	91,121,609,718			
C. Market Value Beginning of Year	86,585,851,024	80,876,605,054			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	1,354,235,298	1,410,501,971			
D2. Employer and other Non-Member Contributions	1,997,432,754	2,066,634,038			
D3. Refund of Member Accounts	(388,067,394)	(407,308,374)			
D4. Retirement Benefits	(6,101,603,747)	(6,310,936,996)			
D5. Member Balance Transfers / Intraplan Transfers / Other	5,140,249	5,476,355			
D6. Admin Expenses	(51,791,090)	(51,899,317)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,184,653,930)	(3,287,532,323)			
E. Investment Return					
E1. Market Total: B-C-D7	(\$2,524,592,040)	13,532,536,987			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	5,846,724,421	5,909,157,446			
E4. Amount Subject to Phase-In: E1-E3	\$(8,371,316,461)	7,623,379,541			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	\$(2,092,829,115)	1,905,844,885			
F2. First Prior Year	1,686,870,476	(2,092,829,115)	\$ 1,905,844,885		
F3. Second Prior Year	65,954,091	1,686,870,476	(2,092,829,115)	\$ 1,905,844,885	
F4. Third Prior Year	(1,403,501,410)	65,954,090	1,686,870,477	(2,092,829,116)	\$ 1,905,844,886
F5. Total Phase-Ins	(1,743,505,958)	1,565,840,336	1,499,886,247	(186,984,231)	1,905,844,886
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 83,715,397,357	\$ 87,902,862,816			
G2. Upper Corridor Limit: 112% x B	90,581,797,660	102,056,202,884			
G3. Lower Corridor Limit: 88% x B	71,171,412,448	80,187,016,552			
G4. Funding Value End of Year	\$ 83,715,397,357	\$ 87,902,862,816			
H. Difference Between Market and Funding Value	(2,838,792,303)	3,218,746,902	1,718,860,655	1,905,844,886	-
I. Recognized Rate of Return	5.05 %	9.11 %			
J. Market Rate of Return	(2.97)%	17.08 %			
K. Ratio of Funding Value to Market Value	104 %	96 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.



## Development of Funding Value of Pension Defined Benefit Assets Combined Plan

Year Ended December 31	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 478,628,188	\$ 551,671,164			
B. Market Value End of Year	531,500,579	669,083,950			
C. Market Value Beginning of Year	501,251,884	531,500,579			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions	51,852,251	51,921,287			
D3. Refund of Member Accounts	(3,732,159)	(4,148,960)			
D4. Retirement Benefits	(2,362,506)	(3,184,930)			
D5. Member Balance Transfers / Intraplan Transfers / Other	385,748	(1,381,108)			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	46,143,334	43,206,289			
E. Investment Return					
E1. Market Total: B-C-D7	(15,894,639)	94,377,082			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	36,122,390	41,275,750			
E4. Amount Subject to Phase-In: E1-E3	(52,017,029)	53,101,332			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	(13,004,257)	13,275,333			
F2. First Prior Year	9,233,433	(13,004,257)	\$ 13,275,333		
F3. Second Prior Year	375,321	9,233,433	(13,004,257)	\$ 13,275,333	
F4. Third Prior Year	(5,827,245)	375,322	9,233,432	(13,004,258)	\$ 13,275,333
F5. Total Phase-Ins	(9,222,748)	9,879,831	9,504,508	271,075	13,275,333
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 551,671,164	\$ 646,033,034			
G2. Upper Corridor Limit: 112% x B	595,280,648	749,374,024			
G3. Lower Corridor Limit: 88% x B	467,720,510	588,793,876			
G4. Funding Value End of Year	\$ 551,671,164	\$ 646,033,034			
H. Difference Between Market and Funding Value	(20,170,585)	23,050,916	13,546,408	13,275,333	-
I. Recognized Rate of Return	5.36 %	8.92 %			
J. Market Rate of Return	(3.03)%	17.06 %			
K. Ratio of Funding Value to Market Value	104 %	97 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.



## Development of Funding Value of Pension Defined Benefit Assets DB Portion of Member Directed Plan

Year Ended December 31	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 16,770,041	\$ 19,916,815			
B. Market Value End of Year	19,260,428	23,842,012			
C. Market Value Beginning of Year	17,759,008	19,260,428			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions	2,924,135	385,688			
D3. Refund of Member Accounts	(1,279,010)	(1,355,424)			
D4. Retirement Benefits	(1,331,881)	(1,588,432)			
D5. Member Balance Transfers / Intraplan Transfers / Other	1,797,837	3,542,529			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	2,111,081	984,361			
E. Investment Return					
E1. Market Total: B-C-D7	(609,661)	3,597,223			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	1,283,442	1,469,448			
E4. Amount Subject to Phase-In: E1-E3	(1,893,103)	2,127,775			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	(473,276)	531,944			
F2. First Prior Year	371,464	(473,276)	\$ 531,944		
F3. Second Prior Year	20,513	371,464	(473,276)	\$ 531,944	
F4. Third Prior Year	(166,450)	20,511	371,465	(473,275)	\$ 531,943
F5. Total Phase-Ins	(247,749)	450,643	430,133	58,669	531,943
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 19,916,815	\$ 22,821,267			
G2. Upper Corridor Limit: 112% x B	21,571,679	26,703,053			
G3. Lower Corridor Limit: 88% x B	16,949,177	20,980,971			
G4. Funding Value End of Year	\$ 19,916,815	\$ 22,821,267			
H. Difference Between Market and Funding Value	(656,387)	1,020,745	590,612	531,943	-
I. Recognized Rate of Return	5.81 %	9.41 %			
J. Market Rate of Return	(3.24)%	18.21 %			
K. Ratio of Funding Value to Market Value	103 %	96 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment return (line E4) are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.





# Allocation of Funding Value of Assets Among Divisions

## December 31, 2019

### Traditional, Combined and Member Directed Plans

	Total DB System				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1) Employer Accumulation Fund</b>					
<b>(a) Allocated Amounts</b>	\$ 3,306,237,127	\$ 7,390,519,231	\$ (11,823,033)	\$ 1,035,913,135	\$ 11,720,846,460
<b>(b) Unallocated Amounts Allocated by (1)(a)</b>	16,649,654	38,388,761	(64,604)	5,660,479	60,634,290
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	\$ 3,322,886,781	\$ 7,428,907,992	\$ (11,887,637)	\$ 1,041,573,614	\$ 11,781,480,750
<b>(2) Employee Savings Fund (ESF)</b>					
<b>(a) Total Member Deposits</b>	\$ 6,058,790,092	\$ 9,227,464,210	\$ 4,077,642	\$ 806,078,945	\$ 16,096,410,889
<b>(b) ESF Allocated by (2)(a)</b>	\$ 5,725,711,526	\$ 8,721,605,815	\$ 3,852,960	\$ 761,663,184	\$ 15,212,833,485
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 25,924,337,951	\$ 36,080,147,442	\$ 46,710,515	\$ 2,580,762,977	\$ 64,631,958,885
<b>(b) Additional and DC Annuities</b>	171,943	59,071,617	0	0	59,243,560
<b>(c) Total Retiree Assets</b>	\$ 25,924,509,894	\$ 36,139,219,059	\$ 46,710,515	\$ 2,580,762,977	\$ 64,691,202,445
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	\$ 34,973,108,201	\$ 52,289,732,866	\$ 38,675,838	\$ 4,383,999,775	\$ 91,685,516,680
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	49,187,156	73,560,903	54,839	6,216,102	129,019,000
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	\$ 35,022,295,357	\$ 52,363,293,769	\$ 38,730,677	\$ 4,390,215,877	\$ 91,814,535,680
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(1,236,934,290)	(1,849,437,762)	(1,368,108)	(155,078,403)	(3,242,818,563)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	\$ 33,785,361,067	\$ 50,513,856,007	\$ 37,362,569	\$ 4,235,137,474	\$ 88,571,717,117

Amounts in rows 1b, 2b, and 5 were provided by OPERS in total and allocated to each division by the actuary.

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2019

### Traditional Plan

	Traditional Plan				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1) Employer Accumulation Fund (EAF)</b>					
<b>(a) Allocated Amounts</b>	\$ 3,042,954,512	\$ 7,019,566,497	\$ (11,823,033)	\$ 1,035,913,135	\$ 11,086,611,111
<b>(b) Unallocated Amounts Allocated by (1)(a)</b>	16,627,437	38,356,604	(64,604)	5,660,479	60,579,916
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	<u>\$ 3,059,581,949</u>	<u>\$ 7,057,923,101</u>	<u>\$ (11,887,637)</u>	<u>\$ 1,041,573,614</u>	<u>\$ 11,147,191,027</u>
<b>(2) Employee Savings Fund (ESF)</b>					
<b>(a) Total Member Deposits</b>	\$ 6,058,648,196	\$ 9,227,426,298	\$ 4,077,642	\$ 806,078,945	\$ 16,096,231,081
<b>(b) ESF Allocated by (2)(a)</b>	\$ 5,724,810,580	\$ 8,718,985,818	\$ 3,852,960	\$ 761,663,184	\$ 15,209,312,542
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 25,905,417,117	\$ 36,043,952,980	\$ 46,710,515	\$ 2,580,762,977	\$ 64,576,843,589
<b>(b) Additional Annuities</b>	171,943	59,071,617	0	0	59,243,560
<b>(c) Total Retiree Assets</b>	<u>\$ 25,905,589,060</u>	<u>\$ 36,103,024,597</u>	<u>\$ 46,710,515</u>	<u>\$ 2,580,762,977</u>	<u>\$ 64,636,087,149</u>
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	<u>\$ 34,689,981,589</u>	<u>\$ 51,879,933,516</u>	<u>\$ 38,675,838</u>	<u>\$ 4,383,999,775</u>	<u>\$ 90,992,590,718</u>
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	49,187,156	73,560,903	54,839	6,216,102	129,019,000
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 34,739,168,745</u>	<u>\$ 51,953,494,419</u>	<u>\$ 38,730,677</u>	<u>\$ 4,390,215,877</u>	<u>\$ 91,121,609,718</u>
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(1,227,113,877)	(1,835,186,514)	(1,368,108)	(155,078,403)	(3,218,746,902)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	<u>\$ 33,512,054,868</u>	<u>\$ 50,118,307,905</u>	<u>\$ 37,362,569</u>	<u>\$ 4,235,137,474</u>	<u>\$ 87,902,862,816</u>

Amounts in rows 1b, 2b, and 5 were provided by OPERS in total and allocated to each division by the actuary.

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2019

### Combined Plan

	Combined Plan				
	State	Local	Public Safety	Law Enforcement	Total
<b>(1)</b> Employer Accumulation Fund					
<b>(a)</b> Allocated Amounts	\$ 261,627,772	\$ 369,044,310	\$0	\$0	\$ 630,672,082
<b>(b)</b> Unallocated Amounts Allocated by (1)(a)	25,393	35,819	0	0	61,212
<b>(c)</b> OPERS Directed Asset Reallocation	0	0	0	0	0
<b>(d)</b> Total EAF (1)(a) + (1)(b) + (1)(c)	<u>\$ 261,653,165</u>	<u>\$ 369,080,129</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 630,733,294</u>
<b>(2)</b> Employee Savings Fund					
<b>(a)</b> Total Member Deposits	\$ 374,406	\$ 1,077,357	\$0	\$0	\$ 1,451,763
<b>(b)</b> ESF Allocated by (2)(a)	\$ 883,676	\$ 2,542,790	\$0	\$0	\$ 3,426,466
<b>(3)</b> Retired Assets					
<b>(a)</b> Allocated Amounts	\$ 12,661,909	\$ 22,262,281	\$0	\$0	\$ 34,924,190
<b>(b)</b> DC Annuities	0	0	0	0	0
<b>(c)</b> Total Retiree Assets	<u>\$ 12,661,909</u>	<u>\$ 22,262,281</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 34,924,190</u>
<b>(4)</b> Subtotal: (1)(d) + (2)(b) + (3)(c)	<u>\$ 275,198,750</u>	<u>\$ 393,885,200</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 669,083,950</u>
<b>(5)</b> Assets Held for Upcoming Year Budget Allocated According to (4)	0	0	0	0	0
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	<u>\$ 275,198,750</u>	<u>\$ 393,885,200</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 669,083,950</u>
<b>(7)</b> Market Value Adjustment Allocated According to (6)	(9,480,998)	(13,569,918)	0	0	(23,050,916)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	<u>\$ 265,717,752</u>	<u>\$ 380,315,282</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 646,033,034</u>

Amounts in rows 1b, 2b, and 5 were provided by OPERS in total and allocated to each division by the actuary.

# Allocation of Funding Value of Assets Among Divisions

## December 31, 2019

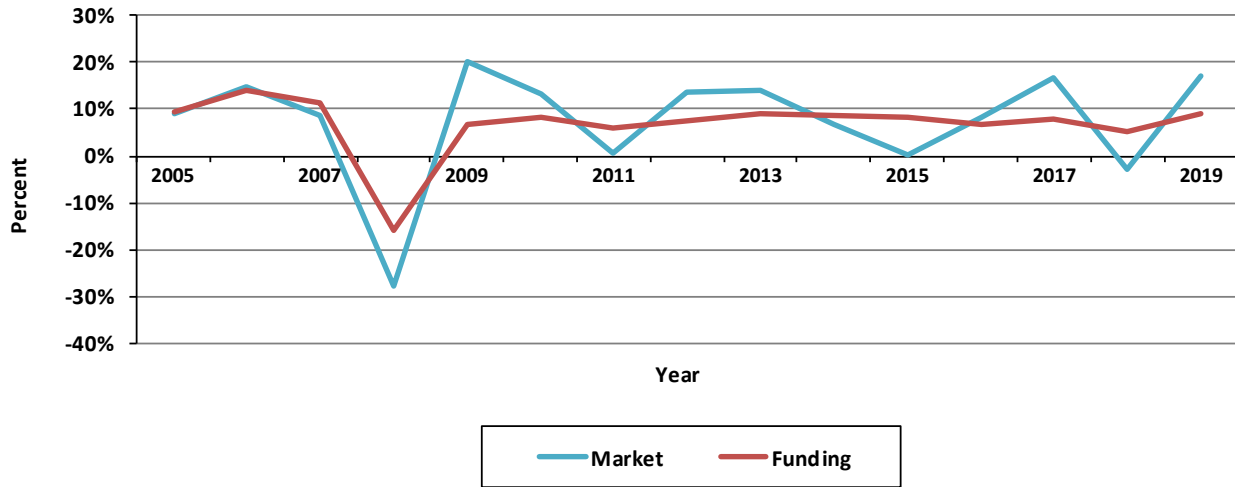
### Member Directed Plan

	Member-Directed Plan				Total
	State	Local	Public Safety	Law Enforcement	
<b>(1) Employer Accumulation Fund</b>					
<b>(a) Allocated Amounts</b>	\$ 1,654,843	\$ 1,908,424	\$0	\$0	\$ 3,563,267
<b>(b) Unallocated Amounts Allocated by 1(a)</b>	(3,176)	(3,662)	0	0	(6,838)
<b>(c) OPERS Directed Asset Reallocation</b>	0	0	0	0	0
<b>(d) Total EAF (1)(a) + (1)(b) + (1)(c)</b>	\$ 1,651,667	\$ 1,904,762	\$0	\$0	\$ 3,556,429
<b>(2) Employee Savings Fund</b>					
<b>(a) Total Member Deposits</b>	\$ (232,510)	\$ (1,039,445)	\$0	\$0	\$ (1,271,955)
<b>(b) ESF Allocated by (2)(a)</b>	\$ 17,270	\$ 77,207	\$0	\$0	\$ 94,477
<b>(3) Retired Assets</b>					
<b>(a) Allocated Amounts</b>	\$ 6,258,925	\$ 13,932,181	\$0	\$0	\$ 20,191,106
<b>(b) No Division</b>	0	0	0	0	0
<b>(c) Total Retiree Assets</b>	\$ 6,258,925	\$ 13,932,181	\$0	\$0	\$ 20,191,106
<b>(4) Subtotal: (1)(d) + (2)(b) + (3)(c)</b>	\$ 7,927,862	\$ 15,914,150	\$0	\$0	\$ 23,842,012
<b>(5) Assets Held for Upcoming Year Budget Allocated According to (4)</b>	0	0	0	0	0
<b>(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)</b>	\$ 7,927,862	\$ 15,914,150	\$0	\$0	\$ 23,842,012
<b>(7) Market Value Adjustment Allocated According to (6)</b>	(339,415)	(681,330)	0	0	(1,020,745)
<b>(8) Funding Value of Defined Benefit Assets (6)+(7)</b>	\$ 7,588,447	\$ 15,232,820	\$0	\$0	\$ 22,821,267

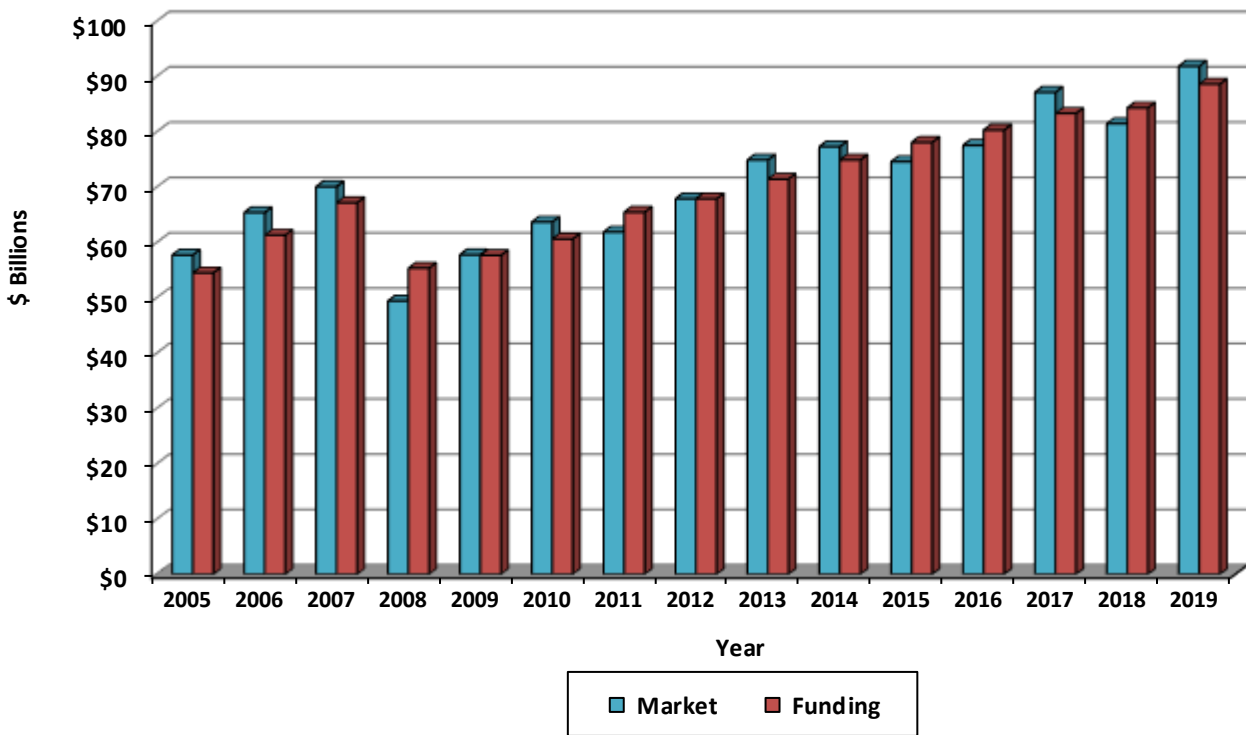
Amounts in rows 1b, 2b, and 5 were provided by OPERS in total and allocated to each division by the actuary.

# Comparison of Defined Benefit Pension Assets

## Comparison of Rates of Return



## Comparison of Defined Benefit Pension Asset Values



## **SECTION III**

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### **BENEFITS AND CONDITIONS EVALUATED**

# Benefits and Conditions Evaluated

## Plans

**Traditional Pension Plan.** The Traditional Pension Plan is a defined benefit plan under which a member's retirement benefit is based on a formula. The formula is determined by years of contributing service and the average of the three (or five if a member of Group C as defined on page III-4) highest years of earnable salary (or final average salary). OPERS investment professionals manage the investment of employee and employer contributions to ensure that funds are available to pay the formula benefit.

**Combined Plan.** The Combined Plan is a retirement plan with both a defined benefit and a defined contribution component. Under the defined benefit portion of the Combined Plan, the member's benefit is determined by a reduced formula (similar to the Traditional Pension Plan). OPERS investment professionals manage the investment of employer contributions to ensure that funds are available to pay the reduced formula benefit. Under the defined contribution portion of the Combined Plan, employee contributions are deposited into the member's individual defined contribution account and invested as directed by the member. The member's retirement benefit under this portion of the Combined Plan is based on employee contributions and the gains and losses on those contributions. The member directs the investment by selecting from among the nine professionally-managed OPERS Investment Options.

**Member-Directed Plan.** The Member-Directed Plan is a defined contribution plan under which employee and employer contributions are deposited into a member's individual defined contribution account and invested as directed by the member. The member's retirement benefit is based on employee and employer contributions and the gains and losses on those contributions. Under the Member-Directed Plan, the member directs the investment by selecting from several professionally-managed OPERS Investment Options.

# Benefits and Conditions Evaluated

## Terms

**Final Average Salary** (“FAS”) means the average of the annual earnings for the 3 highest calendar years of compensation for Transition Group A and B members. The highest 5 calendar years is used for Transition Group C members.

**Participant Contribution Account** is the account for each Participant in the Combined or Member-Directed Plan to which shall be credited the employee contributions.

**Miscellaneous Contribution Account** is the account to which shall be credited any voluntary after-tax contributions for members in the Combined and Member-Directed Plans.

**Rollover Account** is the account to which shall be credited any rollover amounts for members in the Combined or Member-Directed Plans.

**Employers’ Accumulation Fund** is the fund to which shall be credited employer contributions for members in the Traditional or Combined Plan. There are separate accounts in the Employers’ Accumulation Fund for the Combined Plan and the Traditional Pension Plan.

**Employer Contribution Account** is the fund to which shall be credited a portion of the employer contributions for members in the Member-Directed Plan.

## Contributions

**Member Contributions.** Member contribution rates as a % of earnable salary are presented on page III-3.

**Employer Contributions.** Each employer contributes the remaining amounts necessary to finance OPERS benefits. Employer contributions are expressed as percents of member-covered payroll. The maximum statutory rate for state and local government employers is 14.0%. The maximum statutory rate for law enforcement employers is 18.1% (H.B. 416, effective 1/1/2001).



## Benefits and Conditions Evaluated

### Contributions (Concluded)

**Health Care Preservation Plan (HCPP).** The following table shows total scheduled employer contribution rates (includes contributions for both the pension and retiree health programs):

Year	State	Local Government	Law Enforcement	Public Safety
2020 and Thereafter	14.00%	14.00%	18.10%	18.10%

The portion of the above employer contribution rates scheduled to be allocated to the retiree health program are as follows:

Year	All Divisions
2020 and Thereafter	0.0%

Health care funding portion of contribution rates are according to the Board adopted schedule.

Member contribution rates scheduled to be allocated to the pension program are as follows:

Year	State	Local Government	Law Enforcement	Public Safety
2020 and Thereafter	10.00%	10.00%	13.00%	12.00%

## Senate Bill 343

**Senate Bill 343.** Senate Bill (SB) 343 became effective January 7, 2013. The benefit changes enacted by SB 343 do not apply to members who retired with an effective date of January 1, 2013 or earlier. The benefit provisions enumerated on pages III-9 through the end of Section III are the provisions that were applicable prior to the enactment of SB 343. Changes to the benefit provisions resulting from Senate Bill 343 are enumerated on pages III-4 through III-8.

**Transition Groups.** A transition plan was developed as part of the SB 343 benefit changes. The transition group to which a member belongs is dependent upon the date at which that member is first eligible to retire with a reduced or unreduced benefit.

A member is in Group A if the member is eligible to retire under the retirement eligibility conditions in place prior to the passage of SB 343 on or before January 7, 2018.

A member is in Group B if the member is not in Group A and satisfies either of the following conditions:

- (1) The member has 20 years of service credit as of January 7, 2013, or
- (2) The member is eligible to retire under the retirement eligibility conditions in place prior to the passage of SB 343 on or before January 7, 2023.

A member is in Group C if the member satisfies either of the following conditions:

- (1) The member was hired prior to January 7, 2013 but was not in Group A or Group B, or
- (2) The member was hired on or after January 7, 2013.

**Key Benefit Changes.** There are five key components that were affected by SB 343:

- (1) Age and service retirement eligibility conditions,
- (2) Benefit formula,
- (3) Cost-of-living Allowance (COLA),
- (4) Final Average Salary (FAS) period, and
- (5) Early retirement reduction factors

# Senate Bill 343

## Key Benefit Changes for Transition Group A

**COLAs.** COLAs provided up to December 31, 2018 will be based upon a simple (i.e., not compound), 3 percent COLA. COLAs provided after December 31, 2018 continue to be simple, but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the Consumer Price Index (CPI), but not greater than 3%.

## Key Benefit Changes for Transition Group B

**Retirement Eligibility.** The table below shows retirement eligibility conditions for Group B members:

Valuation Group	Unreduced		Reduced	
	Age	Service	Age	Service
State / Local Government	52	31	55	25
	Any	32		
	66	5	60	5
Law Enforcement	50	25	48	25
	64	15	52	15
Public Safety	54	25	48	25
	64	15	52	15

**Early Retirement Reduction Factors.** Presented below are the reduction factors, expressed as a percentage of the base amount, applicable to a Group B member who retires with a reduced benefit:

### State and Local Government:

Service	Ages										
	55	56	57	58	59	60	61	62	63	64	65
30	75%	76%	78%	79%	80%	82%	83%	85%	86%	88%	89%
29	69	70	72	73	74	75	76	78	79	80	89
28	64	65	66	67	68	69	70	71	72	80	89
27	59	60	61	62	62	63	64	65	72	80	89
26	55	55	56	57	57	58	59	65	72	80	89
25	50	51	51	52	52	53	59	65	72	80	89
24 & Under						53	59	65	72	80	89

# Senate Bill 343

## Law Enforcement and Public Safety:

Law Enforcement		Public Safety	
Age	Factor	Age	Factor
48	84%	48	58%
49	92	49	64
50	100	50	70
		51	76
		52	83
		53	91
		54	100

**COLAs.** COLAs continue to be simple (i.e., not compound), but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the June to June Consumer Price Index (CPI-W), but not greater than 3%.

## Key Benefit Changes for Transition Group C

**Retirement Eligibility.** The table below shows retirement eligibility conditions for Group C members:

Valuation Group	Unreduced		Reduced	
	Age	Service	Age	Service
State / Local Government	55	32	57	25
	67	5	62	5
Law Enforcement	52	25	48	25
	64	15	56	15
Public Safety	56	25	52	25
	64	15	56	15

## Senate Bill 343

**Early Retirement Reduction Factors.** Presented below are the reduction factors, expressed as a percentage of the base amount, applicable to a Group C member that retires with a reduced benefit:

### State and Local Government:

Service	Ages									
	57	58	59	60	61	62	63	64	65	66
31	80%	80%	81%	82%	83%	85%	86%	87%	88%	89%
30	73	74	75	75	76	77	78	79	80	89
29	67	68	68	69	70	70	71	72	80	89
28	61	62	62	63	63	64	64	72	80	89
27	56	57	57	57	58	58	64	72	80	89
26	51	52	52	52	52	58	64	72	80	89
25	47	47	47	47	52	58	64	72	80	89
24 & Under						58	64	72	80	89

### Law Enforcement and Public Safety:

Law Enforcement		Public Safety	
Age	Factor	Age	Factor
48	70%	52	69%
49	76	53	76
50	84	54	83
51	91	55	91
52	100	56	100

**COLAs.** COLAs continue to be simple (i.e., not compound), but the simple COLA percentage applicable in a year will be based upon the annual percentage change in the June to June Consumer Price Index (CPI-W), but not greater than 3%.

## Senate Bill 343

**FAS Period.** Final average salary is based on the average of the annual earnings for the 5 highest calendar years of compensation.

**Benefit Formula.** Service breakpoint for the 2.50% benefit multiplier in the Traditional Plan or 1.25% benefit multiplier in the Combined Plan for State and Local Government members increased from 30 years to 35 years.

### Other Benefit Changes for All Transition Groups

**Minimum Benefit.** The \$86 minimum benefit provision has been eliminated.

**Long Interest Calculation.** The minimum allowance calculation based upon twice the member's savings funding balance at retirement together with interest credits, annuitized with unisex factors that reflect plan interest and mortality assumptions, but not the plan's COLA, has been eliminated.

**Disability Program.** The definition of disability was changed to a more restrictive definition which is expected to result in a reduction in future disability cases.

# Traditional Pension Plan – Pre Senate Bill 343

## Age & Service Benefits - State and Local Government Members

**Age and service eligibility.** A member who (i) has attained age 60 years and has 5 or more years of service credit or 60 contributing months, or (ii) has attained age 55 years and has 25 or more years of service credit, or (iii) has 30 or more years of service credit, may retire with an age and service retirement allowance.

**Age and service allowance.** A retiring member’s age and service allowance is equal to Ohio service credit times the greater of \$86, or 2.2% of FAS for the first 30 years of service plus 2.5% for years of service over 30 years (H.B. 628). The allowance is then adjusted by factors based on attained age or years of service (whichever yields the higher percentage) as determined in the following schedule:

Attained Age	OR	Years of Service Credit	Percentage of Base Amount
58		25	75%
59		26	80
60		27	85
61		N/A	88
N/A		28	90
62		N/A	91
63		N/A	94
N/A		29	95
64		N/A	97
65		30 or more	100

Maximum allowance is 100% of FAS or the limits under IRC Section 415(b). Minimum allowance is based upon twice the member’s savings funding balance at retirement together with interest credits, annuitized with unisex factors that reflect plan interest and mortality assumptions, but not the plan’s COLA.

## Traditional Pension Plan – Pre Senate Bill 343

### Age & Service Benefits – Law Members (Public Safety) Eligible to Retire under Ohio Revised Code Section 145.33(B)(2)(b)

**Age and service eligibility.** A law member whose secondary duties are to preserve the peace, to protect life and property, and to enforce the laws of the state and who (i) has attained age 52 and has 25 or more years of credited service, or (ii) has attained age 62 and has 15 or more years of credited service, or (iii) has attained age 52 and has 15 or more years of credited service, may retire with an age and service allowance. A member covered by these provisions may retire early at age 48 with 25 or more years of service and receive the following percentage of the base benefit: 75%, 80%, 86%, or 93% at retirement ages 48, 49, 50 and 51 respectively.

**Age and service allowance.** A retiring member's age and service allowance under eligibility (i) or (ii) above is equal to 2.5% of FAS times the first 25 years of service credit plus 2.1% of FAS times service credit in excess of 25 years (H.B. 628). Maximum allowance is 90% of FAS or the limits under IRC Section 415(b). A retiring member's age and service allowance under eligibility (iii) above is equal to 1.5% of FAS times years of service credit. Minimum allowance for all law members is based upon twice the member's savings fund balance at retirement together with interest credits.

### Age & Service Benefits - Law Members (Law Enforcement) Eligible to Retire under Ohio Revised Code Section 145.33(B)(2)(a)

**Age and service eligibility.** A law member whose primary duties are to preserve the peace, to protect life and property, and to enforce the laws of the state and who (i) has attained age 48 and has 25 or more years of credited service, or (ii) has attained age 62 and has 15 or more years of credited service, or (iii) has attained age 52 and has 15 or more years of credited service, may retire with an age and service allowance.

**Age and service allowance.** A retiring member's age and service allowance under eligibility (i) or (ii) above is equal to 2.5% of FAS times the first 25 years of service credit plus 2.1% of FAS times service credit in excess of 25 years (H.B. 628). Maximum allowance is 90% of FAS or the limits under IRC Section 415(b). A retiring member's age and service allowance under eligibility (iii) above is equal to 1.5% of FAS times years of service credit. Minimum allowance for all law members is based upon twice the member's savings fund balance at retirement together with interest credits.



# Traditional Pension Plan – Pre Senate Bill 343

## Disability Retirement

The disability program was revised in 1992, in order to comply with the Older Workers Benefit Protection Act. Employees becoming members after July 29, 1992 are covered by the post July 29, 1992 program. Other members were able to elect coverage under the pre July 29, 1992 program (original plan) or elect to be covered by the post July 29, 1992 program (revised plan).

Features of the original plan are:

- a) Upon becoming permanently disabled after completion of at least 5 years or 60 contributing months of service but before attaining age 60, a member is eligible for a disability allowance. The service requirement is waived for Law Enforcement members with an on-duty illness or injury.
- b) The amount of the allowance is the service the member would have had if employment had continued to age 60 times (i) 2.2% of FAS (H.B. 628), or (ii) \$86, whichever produces the greater benefit.
- c) Maximum allowance is 75% of FAS, minimum allowance is 30% of FAS.

Features of the revised plan are:

- a) A member may apply at any age after completion of 5 years or 60 contributing months of service. The service requirement is waived for Law Enforcement members with an on-duty illness or injury.
- b) A disability benefit equal to the greater of 45% of FAS or the actual service credit times 2.2% of FAS (H.B. 628) with no early retirement reduction (maximum 60% of FAS). The disability benefit period is to age 65 if the member is disabled prior to age 60. The benefit period declines gradually from 60 months for members disabled at ages 60 and 61, to 12 months for members disabled at age 69 or older.
- c) After the disability benefit ends, a service retirement benefit equal to the greater of (i) the accrued benefit based on actual service, or (ii) 2.2% of FAS (H.B. 628) times service credit including the period of disability (maximum 45% of FAS). In addition, an amount equal to the cost-of-living increases the member would have received had the member retired on the basis of age and service is paid.

# Traditional Pension Plan – Pre Senate Bill 343

## Survivor Benefits

**Death while eligible to retire.** If a member dies in service after becoming eligible to retire with an age and service allowance and leaves a surviving spouse or other sole dependent beneficiary, the survivor receives the same amount that would have been paid had the member retired the last day of the month of death and elected the 100% joint and survivor form of payment.

**Survivor (death-in-service) allowances.** If a deceased member had at least 1-1/2 years of contributing service credit, with at least 1/4 year of such service occurring within the 2-1/2 years prior to death, or was receiving a disability benefit, qualified survivors may receive the following monthly benefits. The benefit paid will be the greater of the applicable benefits paid under the following two schedules (H.B. 628):

### Schedule 1

Number of Qualified Survivors Affecting the Benefit	Annual Benefit as a % of Deceased Member's FAS	Minimum Monthly Benefit
1	25%	\$250
2	40%	\$400
3	50%	\$500
4	55%	\$500
5 or more	60%	\$500

### Schedule 2

Years of Service	Annual Benefit as a % of Deceased Member's FAS
20	29%
21	33%
22	37%
23	41%
24	45%
25	48%
26	51%
27	54%
28	57%
29 or more	60%

Qualifying survivors who are paid benefits under Schedule 2 share equally in the benefits, except that if there is a surviving spouse, the spouse receives the greater of 25% of FAS or \$250.

## Traditional Pension Plan – Pre Senate Bill 343

A **qualified spouse** is the surviving spouse of a deceased member who is age 62 or at any age if the deceased member had 10 or more years of Ohio service credit or if the surviving spouse is caring for a qualified child or is adjudged physically or mentally incompetent.

A **qualified child** is a child who has never been married and under the age of 18 (or 22 if attending an approved school), or regardless of age is adjudged physically or mentally incompetent at the time of the member's death.

A **qualified parent** is a dependent parent aged 65 or older (earlier if mentally or physically incompetent) who received at least one-half support from the member during the 12-month period immediately preceding the member's death.

Qualified **survivors of disability benefit recipients** have the FAS used in calculating their benefits adjusted for each year between the effective date of the disability benefit and the recipient's date of death. The FAS is adjusted by the lesser of (1) 3% or (2) the actual average percentage change in the CPI.

### Benefits at Retirement

**Optional Benefit Forms.** Retiring members may elect to have benefits paid in straight life form, in a form that guarantees a minimum number of monthly payments, or in a form that provides a continuation of all or a portion of the monthly benefit to a beneficiary after the death of the retiree. If a retiring member elects benefits in other than straight life form, the monthly amount is adjusted. The adjustment is based upon interest, COLA, and mortality assumptions (with a blend of male and female mortality rates to produce unisex election factors consistent with the gender distribution of members electing optional forms of payment).

## Traditional Pension Plan – Pre Senate Bill 343

**PLOP.** Effective 01/01/2004, retiring members may also elect to receive a Partial Lump Sum Option Payment (PLOP) (S.B.247). The PLOP is an option that allows a retiree to initially receive a partial lump sum benefit payment along with a reduced monthly retirement allowance. The lump sum payment cannot be less than 6 times or more than 36 times the monthly amount that would be payable to the member under the plan of payment selected and shall not result in a monthly allowance that is less than 50% of the monthly benefit. The total amount paid as a lump sum and monthly benefit shall be the actuarial equivalent of the amount that would have been paid had the lump sum not been selected.

**QEBA.** Qualified Excess Benefit Arrangement was established 01/01/2004 (H.B.190). The QEBA is operated in accordance with Internal Revenue Code Section 415(m). Under this arrangement the recipient may be paid the portion of his/her retirement benefit that was previously limited due to IRC Section 415(b).

**Post-retirement increases.** Each July after June 30, 1971 or the annual anniversary established 12 months after the initial date of retirement, each allowance is increased by 3.0% of the corresponding base allowance, except that no allowance shall exceed the limits established by Section 415 of the Internal Revenue Code.

**Post-retirement death benefit.** Upon the death of an age and service or disability retiree, a death benefit in the following amount is payable:

Service Credit at Retirement	Amount of Death Benefit
5 to 9 years	\$ 500
10 to 14 years	1,000
15 to 19 years	1,500
20 to 24 years	2,000
25 or more years	2,500

**Deferred benefits.** A member with at least 5 years of service credit who leaves service before being eligible for an immediate allowance and who does not withdraw accumulated contributions will be entitled to a deferred allowance at age 60. For law members, the age at which benefits commence depends on the amount of service credit. The amount of the allowance will be based on credited service and final average salary at time of leaving service.

# Traditional Pension Plan – Pre Senate Bill 343

## Refund of Members Accumulated Contributions

In the event a member leaves service prior to retirement, the member may elect to receive a refund of contributions with interest and may be eligible to receive an additional amount as described below. These refund provisions are available to all members. If a member dies prior to retirement and survivor benefits are not payable, the member's contributions with interest are paid to a designated beneficiary or other survivor. Interest is credited annually to member contribution balances. The rate of interest credited is determined by the OPERS Board and will not be greater than 6%. At the present time, 1% interest is credited to member contribution balances.

If the member has, or had at the time of death, at least 5 years but less than 10 years of qualified service, an additional 33% of the member's eligible contributions will be paid to the member or survivor. If the member has, or had at the time of death, at least 10 years of qualified service credit, an additional 67% of the member's eligible contributions will be paid to the member or survivor. The additional amount is not paid if the member is a re-employed retiree, or in the case of a deceased member, was receiving disability benefits at the time of death.

## Supplemental Benefits

**Health Care Coverage.** Health care coverage is available to persons meeting retiree health care eligibility requirements. Members retiring with a normal or early service retirement allowance after January 1, 2015 must have 20 or more years of qualified service credit to be eligible for this benefit.

# Traditional Pension Plan – Pre Senate Bill 343

## Additional Annuity Program

The additional annuity program provides Traditional Plan and re-employed retiree members the opportunity of supplementing their retirement income. Members make additional contributions (independent of the contributions described on page III-2) to an account that earns investment income based upon the return of the OPERS Stable Value Fund. At termination, the member may take the additional annuity account balance either as a lump sum or annuitized in monthly payments.

## Re-Employed Retirees

Re-employed age and service retirees contribute to the “Money Purchase Plan”. In most instances, re-employed retirees will continue to receive their retirement allowance during re-employment. Upon termination of re-employment, members are eligible to apply for either a refund of contributions prior to age 65 or a Money Purchase Plan benefit as a lump sum or annuity after age 65. The Money Purchase Plan benefit is equal to member contributions and allowable interest plus an additional 67% matching amount. If monthly benefits are elected, joint and survivor options are also available.

## Combined Plan – Pre Senate Bill 343

### Age & Service Benefits - State and Local Government Members\*

**Eligibility.** A member who (i) has attained age 60 years and has 5 or more years of service credit in the Plan or 60 contributing months in the Plan, or (ii) has attained age 55 years and has 25 or more years of service credit, or (iii) has 30 or more years of service credit, may retire under the Combined Plan with an age and service retirement allowance under the defined benefit portion of the Plan and with a retirement benefit under the defined contribution portion of the Plan.

*\*Law Enforcement and Public Safety members must contribute to the Traditional Pension Plan only.*

**Age and service retirement allowance (Defined Benefit portion of the Plan).** A retiring member’s age and service retirement allowance is equal to Ohio service credit in the Plan times 1.0% of FAS for the first 30 years of service plus 1.25% for years of service over 30 years. The allowance is then adjusted by factors based on attained age or years of service (whichever yields the higher percentage) as determined in the following schedule:

Attained Age	OR	Years of Service Credit	Percentage of Base Amount
58		25	75%
59		26	80
60		27	85
61		N/A	88
N/A		28	90
62		N/A	91
63		N/A	94
N/A		29	95
64		N/A	97
65		30 or more	100

Maximum allowance is 100% of FAS or the limits under IRC Section 415(b).

**Retirement benefit (Defined Contribution portion of the Plan).** The member’s retirement benefit under this portion of the Combined Plan is based on the amounts credited to the Participant Contribution Account, Rollover Account, and Miscellaneous Account and the gains and losses on the amounts in those Accounts.

# Combined Plan – Pre Senate Bill 343

## Disability Retirement

A Combined Plan member may apply after completion of 5 years in the Plan or 60 contributing months of service in the Plan. Combined Plan members may be covered under the original or revised disability plan. Combined Plan members who apply for disability may:

- 1) Take a lump sum distribution of the Participant Contribution Account, Rollover Account, and Miscellaneous Account and any additional amount they are entitled to from the Employers' Accumulation Fund, or
- 2) Transfer all service credit and the Participant's Accounts (as listed above) in the Combined Plan to the Traditional Pension Plan to be paid a disability benefit under the Traditional Pension Plan guidelines.

## Survivor Benefits

Combined Plan members are eligible for the same survivor benefits as those listed under the Traditional Pension Plan and must qualify for survivor benefits under the same guidelines as those members in the Traditional Pension Plan.

## Benefits at Retirement

**Optional Benefit Forms under the Defined Benefit portion of the Plan.** Retiring members may elect to have their age and service retirement allowance in straight life form, in a form that guarantees a minimum number of monthly payments, or in a form that provides a continuation of all or a portion of the monthly benefit to a beneficiary after the death of the retiree. If a retiring member elects benefits in other than straight life form, the monthly amount is adjusted. The adjustment is based upon interest, COLA, and mortality assumptions (with a blend of male and female mortality rates to produce unisex election factors consistent with the gender distribution of members electing optional forms of payment).



## Combined Plan – Pre Senate Bill 343

**Optional Benefit Forms under the Defined Contribution portion of the Plan.** Retiring members may elect to have retirement benefits paid in a partial lump sum, subject to any rules adopted by the Board; monthly annuity payments (with joint and survivor options) similar to those offered under the defined benefit portion of the Plan; periodic payments over a period certain; periodic payments of a specific monthly amount; payments with a deferred start date; or a combination of these options.

**QEBA.** Qualified Excess Benefit Arrangement was established 01/01/2004 (H.B.190). The QEBA is operated in accordance with Internal Revenue Code Section 415(m). Under this arrangement the recipient may be paid the portion of his/her retirement benefit that was previously limited due to IRC Section 415(b). The QEBA is available to Combined Plan members for the age and service retirement allowance under the defined benefit portion of the Plan.

**Post-retirement increases.** Each July after June 30, 1971 or the annual anniversary established 12 months after the initial date of retirement, each age and service retirement allowance under the defined benefit portion of the plan is increased by 3.0% of the corresponding base allowance, except that no allowance shall exceed the limits established by Section 415 of the Internal Revenue Code.

**Post-retirement death benefit.** Upon the death of an age and service retiree, a death benefit in the following amount is payable:

Service Credit at Retirement	Amount of Death Benefit
5 to 9 years	\$ 500
10 to 14 years	1,000
15 to 19 years	1,500
20 to 24 years	2,000
25 or more years	2,500

## Combined Plan – Pre Senate Bill 343

### Refunds and Vesting

A participant in the Combined Plan shall at all times be 100% vested in the Participant Contribution Account, Miscellaneous Contribution Account, and the Rollover Account.

If the member has at least 5 years but less than 10 years of qualified service credit in the Plan, an additional 33% of the member's eligible contributions will be paid from the Employers' Accumulation Fund. If the member has at least 10 years of qualified service credit in the Plan, an additional 67% of the member's eligible contributions will be paid to the member. Amounts paid to purchase service credit earn interest at the same rates as the Traditional Pension Plan and are payable as a refund.

In the event a member leaves service prior to retirement, the member may elect to receive a refund of their Participant Contribution Account, the Rollover Account, the Miscellaneous Account, and any additional amounts they are entitled to from the Employers' Accumulation Fund (as described above).

### Supplemental Benefits

**Health Care Coverage.** Health care coverage is available to persons meeting retiree health care eligibility requirements. Members retiring with a normal or early service retirement allowance after January 1, 2015 must have 20 or more years of qualified service credit to be eligible for this benefit.

# Member-Directed Plan

**Age & Service Benefits - State and Local Government Members.** (Law Enforcement and Public Safety members must contribute to the Traditional Pension Plan Only.)

**Eligibility.** A participant who has attained age fifty-five (55) may retire under the Member-Directed Plan.

**Retirement Benefits.** The member's retirement benefit is based on the value of the Participant Contribution Account, the Rollover Account, the Miscellaneous Account, and any vested portion of the Employer Contribution Account.

## Disability Retirement

Not available under the Member-Directed Plan. Members may:

- 1) If age fifty-five (55), terminate employment and begin receiving retirement benefits, or
- 2) Take a lump sum distribution of their Participant Contribution Account, Rollover Account, Miscellaneous Account and any vested portion of the Employer Contribution Account.

## Survivor Benefits

Not available under the Member-Directed Plan. Survivors must take a lump sum distribution of the member's Participant Contribution Account, Rollover Account, Miscellaneous Account and any vested portion of the Employer Contribution Account.

## Benefits at Retirement

**Optional Benefit Forms.** Retiring members may elect to have retirement benefits paid in a partial lump sum, subject to any rules adopted by the Board; monthly annuity payments (with joint and survivor options) similar to those offered under the defined benefit portion of the Combined Plan; periodic payments over a period certain; periodic payments of a specific monthly amount; payments with a deferred start date; or a combination of these options.

# Member-Directed Plan

## Refunds and Vesting.

A participant shall at all times be 100% vested in the Participant Contribution Account, Miscellaneous Contribution Account, and the Rollover Account. A participant shall vest in the Employer Contribution Account according to the Participant's attained years of participation in the Plan as follows:

One year of participation	20%
Two years of participation	40%
Three years of participation	60%
Four years of participation	80%
Five years of participation	100%

In the event a member leaves service prior to retirement, the member may elect to receive a refund of their Participant Contribution Account, Rollover Account, and Miscellaneous Account and any vested amounts in the Employer Contribution Account (as described above).

## Supplemental Benefits

**Health Care Coverage.** A portion of the employer contribution for Member-Directed participants is credited to a Retiree Medical Account (RMA). Amounts contributed to the RMA may be used after separation from service and a refund or retirement distribution is made to pay qualified health, dental and vision care expenses. Beginning January 1, 2009, members vest in their RMA based on their attained years of participation in the Plan as follows:

Less than 1 year	0%
1 year	20%
2 years	40%
3 years	60%
4 years	80%
5 years	100%

# Sample Benefit Computation – Traditional Plan

## State or Local Member (Transition Group A) - Normal Retirement

### Retiring December 31, 2019

### Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	33	Years of Credited Service
C.	59	Age of Retiree
D.	56	Age of Spouse
E.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit: $(0.022 \times 30 \text{ years} + 0.025 \times 3 \text{ years}) \times \$32,000 =$	\$ 23,520
G.	Reduction for Line E Election: $\# (1 - 0.84697) \times (F) =$	3,599
H.	Benefit Payable to Retiree while Spouse is Alive: $(F) - (G) =$	19,921
I.	Benefit Payable to Spouse after Retiree's Death	19,921
J.	Benefit Payable to Retiree after Spouse's Death	23,520

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2020	\$ 19,921	\$ 19,921	\$ 23,520
2021	20,519	20,519	24,226
2022	21,116	21,116	24,931
2023	21,714	21,714	25,637
2024	22,312	22,312	26,342
2025	22,909	22,909	27,048
2026	23,507	23,507	27,754
2027	24,104	24,104	28,459
2028	24,702	24,702	29,165
2029	25,300	25,300	29,870

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.  
 # Based on conversion factors for optional forms of payment in effect December 31, 2019.

# Sample Benefit Computation – Traditional Plan State or Local Member (Transition Group A) - Early Retirement Retiring December 31, 2019 Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	26	Years of Credited Service
C.	59	Age of Retiree
D.	56	Age of Spouse
E.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$0.022 \times 26 \text{ years} \times \$32,000 =$	\$ 18,304
G.	Adjustment Factor for Early Retirement (from schedule)		80%
H.	Adjusted Benefit:	$(F) \times (G) =$	14,643
I.	Reduction for Line E Election: # $(1 - 0.84697) \times (H) =$		2,241
J.	Benefit Payable to Retiree while Spouse is Alive: $(H) - (I)$		12,402
K.	Benefit Payable to Spouse after Retiree's Death		12,402
L.	Benefit Payable to Retiree after Spouse's Death		14,643

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2020	\$ 12,402	\$ 12,402	\$ 14,643
2021	12,774	12,774	15,082
2022	13,146	13,146	15,522
2023	13,518	13,518	15,961
2024	13,890	13,890	16,400
2025	14,263	14,263	16,840
2026	14,635	14,635	17,279
2027	15,007	15,007	17,718
2028	15,379	15,379	18,158
2029	15,751	15,751	18,597

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2019.



**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(b) Public Safety  
Member (Transition Group A) - Normal Retirement  
Retiring December 31, 2019  
Under Benefit Provisions Evaluated**

**Data:**

A.	<u>\$38,000</u>	Final Average Earnings
B.	<u>28</u>	Years of Credited Service
C.	<u>49</u>	Age of Retiree
D.	<u>46</u>	Age of Spouse
E.	<u>100%</u>	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$(0.025 \times 25 \text{ years} + 0.021 \times 3 \text{ years}) \times \$38,000 \times 80\% =$	\$ 20,915
G.	Reduction for Line E Election: # $(1 - 0.89936) \times (F) =$		<u>2,105</u>
H.	Benefit Payable to Retiree while Spouse is Alive: $(F) - (G) =$		18,810
I.	Benefit Payable to Spouse after Retiree's Death		18,810
J.	Benefit Payable to Retiree after Spouse's Death		20,915

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2020	\$ 18,810	\$ 18,810	\$ 20,915
2021	19,374	19,374	21,542
2022	19,939	19,939	22,170
2023	20,503	20,503	22,797
2024	21,067	21,067	23,425
2025	21,632	21,632	24,052
2026	22,196	22,196	24,680
2027	22,760	22,760	25,307
2028	23,324	23,324	25,935
2029	23,889	23,889	26,562

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2019.



**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(a) Law Enforcement  
Member (Transition Group A) - Normal Retirement  
Retiring December 31, 2019  
Under Benefit Provisions Evaluated**

**Data:**

A.	<u>\$38,000</u>	Final Average Earnings
B.	<u>28</u>	Years of Credited Service
C.	<u>49</u>	Age of Retiree
D.	<u>46</u>	Age of Spouse
E.	<u>100%</u>	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)

**Computations:**

F.	Formula Benefit:	$(0.025 \times 25 \text{ years} + 0.021 \times 3 \text{ years}) \times \$38,000 =$	\$ 26,144
G.	Reduction for Line E Election: # $(1 - 0.89936) \times (F) =$		<u>2,631</u>
H.	Benefit Payable to Retiree while Spouse is Alive: $(F) - (G) =$		23,513
I.	Benefit Payable to Spouse after Retiree's Death		23,513
J.	Benefit Payable to Retiree after Spouse's Death		26,144

**Projected Benefits:\***

Year Ended December 31,	Retiree's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Retiree's Benefit (After Spouse's Death)
2020	\$ 23,513	\$ 23,513	\$ 26,144
2021	24,218	24,218	26,928
2022	24,924	24,924	27,713
2023	25,629	25,629	28,497
2024	26,335	26,335	29,281
2025	27,040	27,040	30,066
2026	27,745	27,745	30,850
2027	28,451	28,451	31,634
2028	29,156	29,156	32,419
2029	29,862	29,862	33,203

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2019.





# Sample Benefit Computation – Traditional Plan State or Local Member (Transition Group C) – Termination Benefit Terminating December 31, 2019 Under Benefit Provisions Evaluated

**Data:**

A.	\$32,000	Final Average Earnings
B.	15	Years of Credited Service
C.	45	Age of Member
D.	42	Age of Spouse
E.	62:59	Ages at Which Benefits are Payable
F.	100%	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)
G.	\$44,000	Accumulated Contributions with Interest at Termination Date

**Computations:**

H.	Formula Benefit: $(0.022 \times 15 \text{ years} + 0.025 \times 0 \text{ years}) \times \$32,000 =$	\$ 10,560
I.	Adjustment Factor for Early Retirement (from schedule)	58%
J.	Adjusted Benefit: $(H) \times (I) =$	6,125
K.	Reduction for Line F Election: $\# (1 - 0.82672) \times (J) =$	1,061
L.	Benefit Payable to Retiree while Spouse is Alive: $(J) - (K) =$	5,064
M.	Benefit Payable to Spouse after Member's Death	5,064
N.	Benefit Payable to Retiree after Spouse's Death	6,125
O.	In lieu of a lifetime benefit, terminatee may elect to receive a refund of accumulated contributions with interest plus an additional 67% of eligible accumulated contributions because terminatee had more than 10 years of service.	73,480

**Projected Benefits:\***

Year Ended December 31,	Member's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Member's Benefit (After Spouse's Death)
2037	\$ 5,064	\$ 5,064	\$ 6,125
2038	5,216	5,216	6,309
2039	5,368	5,368	6,492
2040	5,520	5,520	6,676
2041	5,671	5,671	6,860
2042	5,823	5,823	7,044
2043	5,975	5,975	7,227
2044	6,127	6,127	7,411
2045	6,279	6,279	7,595
2046	6,431	6,431	7,778

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.

# Based on conversion factors for optional forms of payment in effect December 31, 2019.



**Sample Benefit Computation – Traditional Plan  
Section 145.33 (B)(2)(a) Public Safety/Law Enforcement Member  
(Transition Group C) – Termination Benefit  
Terminating December 31, 2019  
Under Benefit Provisions Evaluated**

**Data:**

A.	<u>\$38,000</u>	Final Average Earnings
B.	<u>15</u>	Years of Credited Service
C.	<u>37</u>	Age of Member
D.	<u>34</u>	Age of Spouse
E.	<u>56:53</u>	Ages at Which Benefits are Payable
F.	<u>100%</u>	Percentage of Pension to Continue to Spouse after retiree's death (Retiree makes the choice of 100% Joint and Survivor with Pop-Up)
G.	<u>\$46,000</u>	Accumulated Contributions at Termination Date

**Computations:**

H.	Formula Benefit: $(0.015 \times 15 \text{ years}) \times \$38,000 =$	\$ 8,550
I.	Reduction for Line F Election: $\# (1 - 0.86503) \times (H) =$	<u>1,154</u>
J.	Benefit Payable to Retiree while Spouse is Alive: $(H) - (I) =$	7,396
K.	Benefit Payable to Spouse after Member's Death	7,396
L.	Benefit Payable to Retiree after Spouse's Death	8,550
M.	In lieu of a lifetime benefit, terminee may elect to receive a refund of accumulated contributions with interest plus an additional 67% of eligible accumulated contributions because terminee had more than 10 years of service.	76,820

**Projected Benefits:\***

Year Ended December 31,	Member's Benefit (Both Alive)	Spouse's Benefit (After Retiree's Death)	Member's Benefit (After Spouse's Death)
2039	\$ 7,396	\$ 7,396	\$ 8,550
2040	7,618	7,618	8,807
2041	7,840	7,840	9,063
2042	8,062	8,062	9,320
2043	8,284	8,284	9,576
2044	8,505	8,505	9,833
2045	8,727	8,727	10,089
2046	8,949	8,949	10,346
2047	9,171	9,171	10,602
2048	9,393	9,393	10,859

\* Assumes the annual percentage change in the Consumer Price Index (CPI) is 3% or greater in all future years.  
# Based on conversion factors for optional forms of payment in effect December 31, 2019.



## **SECTION IV**

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### **RECOMMENDATIONS FOR RESERVE TRANSFERS**

## December 31, 2019 Retired Life Valuation Reserve Transfers

Reserve transfers from the Employer Accumulation Fund to the A & PR Fund and/or Survivor Benefit Funds are recommended in the following instances.

- Whenever the December 31 valuation shows unfunded accrued liabilities or assets in excess of computed liabilities in any of the retired life funds.
- To cover the cost of ad-hoc postretirement benefit increases.
- To adjust retired life reserves for any changes in computed liabilities resulting from assumption changes.

By making these annual adjustments in addition to the regular transfers when allowances are added to the rolls, the ratio of assets to liabilities for retired members and beneficiaries will stay at 100%. Year to year changes in this ratio before recommended transfers will normally be isolated to mortality experience within the retired life group.

In 1992, OPERS began making interim benefit payments for certain retirements to shorten the delay between the retirement effective date and receipt of the first monthly check. However, reserve transfers are not made until benefit amounts are final. Transfers for these cases have been accrued based upon supplemental information supplied by OPERS staff and are shown on the following page. The accruals, when added to other assets, are intended to put retired life reserves in the same position they would have been in if reserve transfers for the interim benefit cases had been coincident with benefit commencement.

It is recommended that the transfers shown on the following page be made from the Employer Accumulation Fund to the Annuity & Pension Reserve Fund and Survivor Benefit Funds as indicated. The Accrued Transfers are an estimate of pending future transfers for interim cases, and does not require a year end transfer. Any accrued transfers that have been made prior to OPERS' extract date and hence are not included in the "Accrued Transfers" column on pages IV-2 through IV-5 should be netted off the "Other" column on pages IV-2 through IV-5.

## Traditional Plan

### Reserve Transfers Affecting the Employer Accumulation Fund

### December 31, 2019

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
SR	\$ 22,240,529,699	\$ 185,920,915	\$ 1,702,887,369	\$ 24,129,337,983	\$ 24,129,337,983	
MP	60,251,259	126,792	(6,558,689)	53,819,362	53,819,362	
AA	171,943	0	16,674	188,617	188,617	
JR	3,333	0	(3,333)	0	0	
CR	163,361,263	0	29,515,088	192,876,351	192,876,351	
DR	2,122,738,992	0	137,462,352	2,260,201,344	2,260,201,344	
BD	646,655,357	1,348,618	35,512,565	683,516,540	683,516,540	
<b>TOTAL A&amp;PR</b>	<b>\$ 25,233,711,846</b>	<b>\$ 187,396,325</b>	<b>\$ 1,898,832,026</b>	<b>\$ 27,319,940,197</b>	<b>\$ 27,319,940,197</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	126,647,007	0	25,830,501	152,477,508	152,477,508	
S-2	545,230,207	0	64,155,706	609,385,913	609,385,913	
<b>TOTAL SBF</b>	<b>\$ 671,877,214</b>	<b>\$ 0</b>	<b>\$ 89,986,207</b>	<b>\$ 761,863,421</b>	<b>\$ 761,863,421</b>	<b>100.0%</b>
<b>TOTAL STATE</b>	<b>\$ 25,905,589,060</b>	<b>\$ 187,396,325</b>	<b>\$ 1,988,818,233</b>	<b>\$ 28,081,803,618</b>	<b>\$ 28,081,803,618</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
SR	\$ 31,225,968,090	\$ 277,795,717	\$ 2,392,869,285	\$ 33,896,633,092	\$ 33,896,633,092	
MP	152,502,048	117,221	(17,285,963)	135,333,306	135,333,306	
AA	59,071,617	0	5,332,966	64,404,583	64,404,583	
JR	4,552	0	(4,552)	0	0	
CR	221,596,754	0	52,517,867	274,114,621	274,114,621	
DR	2,589,674,727	0	159,079,055	2,748,753,782	2,748,753,782	
BD	760,139,991	1,715,279	27,812,136	789,667,406	789,667,406	
<b>TOTAL A&amp;PR</b>	<b>\$ 35,008,957,779</b>	<b>\$ 279,628,217</b>	<b>\$ 2,620,320,794</b>	<b>\$ 37,908,906,790</b>	<b>\$ 37,908,906,790</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	188,751,329	0	37,862,643	226,613,972	226,613,972	
S-2	905,315,489	0	102,159,425	1,007,474,914	1,007,474,914	
<b>TOTAL SBF</b>	<b>\$ 1,094,066,818</b>	<b>\$ 0</b>	<b>\$ 140,022,068</b>	<b>\$ 1,234,088,886</b>	<b>\$ 1,234,088,886</b>	<b>100.0%</b>
<b>TOTAL LOCAL</b>	<b>\$ 36,103,024,597</b>	<b>\$ 279,628,217</b>	<b>\$ 2,760,342,862</b>	<b>\$ 39,142,995,676</b>	<b>\$ 39,142,995,676</b>	<b>100.0%</b>

**Traditional Plan**  
**Reserve Transfers Affecting the Employer Accumulation Fund**  
**December 31, 2019**

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>Public Safety</b>						
A&PR FUND						
SR	\$ 9,854,848	\$ 0	\$ 584,628	\$ 10,439,476	\$ 10,439,476	
MP	0	0	0	0	0	
AA	0	0	0	0	0	
JR	0	0	0	0	0	
CR	0	0	0	0	0	
DR	14,360,651	0	1,352,344	15,712,995	15,712,995	
BD	2,042,281	254,381	215,206	2,511,868	2,511,868	
<b>TOTAL A&amp;PR</b>	<b>\$ 26,257,780</b>	<b>\$ 254,381</b>	<b>\$ 2,152,178</b>	<b>\$ 28,664,339</b>	<b>\$ 28,664,339</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	917,442	0	3,175,682	4,093,124	4,093,124	
S-2	19,535,293	0	1,483,643	21,018,936	21,018,936	
<b>TOTAL SBF</b>	<b>\$ 20,452,735</b>	<b>\$ 0</b>	<b>\$ 4,659,325</b>	<b>\$ 25,112,060</b>	<b>\$ 25,112,060</b>	<b>100.0%</b>
<b>TOTAL PUBLIC SAFETY</b>	<b>\$ 46,710,515</b>	<b>\$ 254,381</b>	<b>\$ 6,811,503</b>	<b>\$ 53,776,399</b>	<b>\$ 53,776,399</b>	<b>100.0%</b>
<b>Law Enforcement</b>						
A&PR FUND						
SR	\$ 1,798,019,399	\$ 26,342,146	\$ 136,529,634	\$ 1,960,891,179	\$ 1,960,891,179	
MP	0	0	0	0	0	
AA	0	0	0	0	0	
JR	0	0	0	0	0	
CR	1,463,356	0	117,011	1,580,367	1,580,367	
DR	562,572,633	0	40,894,583	603,467,216	603,467,216	
BD	158,230,115	0	16,185,459	174,415,574	174,415,574	
<b>TOTAL A&amp;PR</b>	<b>\$ 2,520,285,503</b>	<b>\$ 26,342,146</b>	<b>\$ 193,726,687</b>	<b>\$ 2,740,354,336</b>	<b>\$ 2,740,354,336</b>	<b>100.0%</b>
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	11,342,506	0	1,381,520	12,724,026	12,724,026	
S-2	49,134,968	0	8,073,466	57,208,434	57,208,434	
<b>TOTAL SBF</b>	<b>\$ 60,477,474</b>	<b>\$ 0</b>	<b>\$ 9,454,986</b>	<b>\$ 69,932,460</b>	<b>\$ 69,932,460</b>	<b>100.0%</b>
<b>TOTAL LAW ENFORCEMENT</b>	<b>\$ 2,580,762,977</b>	<b>\$ 26,342,146</b>	<b>\$ 203,181,673</b>	<b>\$ 2,810,286,796</b>	<b>\$ 2,810,286,796</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 64,636,087,149</b>	<b>\$ 493,621,069</b>	<b>\$ 4,959,154,271</b>	<b>\$ 70,088,862,489</b>	<b>\$ 70,088,862,489</b>	<b>100.0%</b>

**Combined Plan**  
**Reserve Transfers Affecting the Employer Accumulation Fund**  
**December 31, 2019**

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
CA	\$ 5,096,703	\$ 0	\$ (350,468)	\$ 4,746,235	\$ 4,746,235	
CA RESERVE FOR FUTURE ADVERSE EXPERIENCE	0	0	350,468	350,468	350,468	
CA TOTAL (DC)	\$ 5,096,703	\$ 0	\$ 0	\$ 5,096,703	\$ 5,096,703	
CB TOTAL (DB)	7,565,206	469,110	663,804	8,698,120	8,698,120	
TOTAL A&PR	\$ 12,661,909	\$ 469,110	\$ 663,804	\$ 13,794,823	\$ 13,794,823	100.0%
<b>TOTAL STATE</b>	<b>\$ 12,661,909</b>	<b>\$ 469,110</b>	<b>\$ 663,804</b>	<b>\$ 13,794,823</b>	<b>\$ 13,794,823</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
CA	\$ 8,504,728	\$ 0	\$ (277,102)	\$ 8,227,626	\$ 8,227,626	
CA RESERVE FOR FUTURE ADVERSE EXPERIENCE	0	0	277,102	277,102	277,102	
CA TOTAL (DC)	\$ 8,504,728	\$ 0	\$ 0	\$ 8,504,728	\$ 8,504,728	
CB TOTAL (DB)	13,757,553	64,619	1,336,549	15,158,721	15,158,721	
TOTAL A&PR	\$ 22,262,281	\$ 64,619	\$ 1,336,549	\$ 23,663,449	\$ 23,663,449	100.0%
<b>TOTAL LOCAL</b>	<b>\$ 22,262,281</b>	<b>\$ 64,619</b>	<b>\$ 1,336,549</b>	<b>\$ 23,663,449</b>	<b>\$ 23,663,449</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 34,924,190</b>	<b>\$ 533,729</b>	<b>\$ 2,000,353</b>	<b>\$ 37,458,272</b>	<b>\$ 37,458,272</b>	<b>100.0%</b>

**Member Directed Plan**  
**Reserve Transfers Affecting the Employer Accumulation Fund**  
**December 31, 2019**

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
<b>State</b>						
A&PR FUND						
MD	\$ 6,258,925	\$ 153,926	\$ (79,608)	\$ 6,333,243	\$ 6,333,243	
RESERVE FOR FUTURE ADVERSE EXPERIENCE*	1,329,522	0	(74,318)	1,255,204	1,255,204	
<b>TOTAL STATE</b>	<b>\$ 7,588,447</b>	<b>\$ 153,926</b>	<b>\$ (153,926)</b>	<b>\$ 7,588,447</b>	<b>\$ 7,588,447</b>	<b>100.0%</b>
<b>Local</b>						
A&PR FUND						
MD	\$ 13,932,181	\$ 0	\$ (203,308)	\$ 13,728,873	\$ 13,728,873	
RESERVE FOR FUTURE ADVERSE EXPERIENCE*	1,300,639	0	203,308	1,503,947	1,503,947	
<b>TOTAL LOCAL</b>	<b>\$ 15,232,820</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 15,232,820</b>	<b>\$ 15,232,820</b>	<b>100.0%</b>
<b>GRAND TOTAL</b>	<b>\$ 22,821,267</b>	<b>\$ 153,926</b>	<b>\$ (153,926)</b>	<b>\$ 22,821,267</b>	<b>\$ 22,821,267</b>	<b>100.0%</b>

\* Includes funds for pending retirements.



**SECTION V**

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**STATE DIVISION**

## STATE DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Defined Benefit Active Members in Valuation December 31, 2019*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
<b>Traditional Plan</b>					
Men	44,781	\$ 2,379,516,583	\$ 53,137	42.3 yrs.	10.4 yrs.
Women	55,612	2,813,323,625	50,588	41.5	9.6
Traditional Plan Total	100,393	\$ 5,192,840,208	\$ 51,725	41.9 yrs.	10.0 yrs.
<b>Combined Plan</b>					
Men	1,090	\$ 72,739,342	\$ 66,733	44.5 yrs.	9.3 yrs.
Women	1,679	109,267,649	65,079	44.3	8.8
Combined Plan Total	2,769	\$ 182,006,991	\$ 65,730	44.4 yrs.	9.0 yrs.
<b>Grand Total</b>	<b>103,162</b>	<b>\$ 5,374,847,199</b>	<b>\$ 52,101</b>	<b>41.9 yrs.</b>	<b>10.0 yrs.</b>

Also included in the valuation were 292,040 inactive members and 3,943 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2019*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
<b>Traditional Plan</b>			
A & PR Fund			
Superannuation Retirement	61,964	\$ 179,430,378	\$ 24,322,402,951
Disability Retirement	7,867	21,416,089	2,943,717,884
Money Purchase	1,006	527,102	53,819,362
Total A & PR Fund	70,837	\$ 201,373,569	\$ 27,319,940,197
Total SBF	4,493	6,204,744	761,863,421
Traditional Plan Total	75,330	\$ 207,578,313	\$ 28,081,803,618
<b>Combined Plan</b>			
A & PR Fund			
CB (DB)	123	\$ 61,088	\$ 8,698,120
CA (DC)	79	33,563	5,096,703
Total A & PR Fund	202	\$ 94,651	\$ 13,794,823
Combined Plan Total	202	\$ 94,651	\$ 13,794,823
<b>Member Directed Plan</b>			
A & PR Fund	87	\$ 44,389	\$ 6,333,243
Reserve for Future Adverse Experience			1,255,204
Member Directed Plan Total	87	\$ 44,389	\$ 7,588,447
<b>Grand Total</b>	<b>75,619</b>	<b>\$ 207,717,353</b>	<b>\$ 28,103,186,888</b>

**STATE DIVISION**  
**Employer Contributions to Support**  
**Defined Benefit Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2019			2018
Contributions for	2022			2021
Normal Cost	<u>Traditional Plan</u>	<u>Combined Plan</u>	<u>Traditional and Combined Plans</u>	<u>Traditional and Combined Plans</u>
Age and Service Allowances*	8.28 %	4.62 %	8.16 %	8.20 %
Disability Allowances	1.70 %	1.60 %	1.69 %	1.69 %
Survivor's Benefits	0.34 %	0.28 %	0.34 %	0.34 %
Separation Benefits	4.27 %	0.97 %	4.16 %	4.15 %
Total Normal Cost	14.59 %	7.47 %	14.35 %	14.38 %
(Member Contributions)	10.00 %	0.00 %	9.61 %	9.60 %
Employer Normal Cost	4.59 %	7.47 %	4.74 %	4.78 %
<b>Unfunded Actuarial Accrued Liabilities</b>				
Total Available Contribution	9.41 %	6.53 %	9.26 %	9.22 %
Amortization Years	30	0	29	35
<b>Total Pension Employer Contribution Rate</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>

\* Includes contributions for administrative expenses.

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.



## STATE DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Defined Benefit Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Millions)							
2005@	2008	114,620	\$ 4,339	\$ 37,858	0.2 %	5.43 %	1.57 %	7.00 %	7.00 %	14.00 %
2006	2009	115,930	4,522	39,005	3.0 %	4.97 %	2.03 %	7.00 %	7.00 %	14.00 %
2007	2010	118,466	4,703	39,695	1.8 %	5.44 %	1.56 %	7.00 %	7.00 %	14.00 %
2008	2011	114,925	4,780	41,590	4.8 %	5.44 %	4.56 %	10.00 %	4.00 %	14.00 %
2009	2012	117,008	4,763	40,704	(2.1)%	5.45 %	4.55 %	10.00 %	4.00 %	14.00 %
2010@	2013	118,240	4,811	40,691	0.0 %	5.36 %	7.64 %	13.00 %	1.00 %	14.00 %
2011	2014	118,273	4,844	40,952	0.6 %	5.37 %	8.63 %	14.00 %	0.00 %	14.00 %
2012#	2015	117,430	4,690	39,938	(2.5)%	3.49 %	7.51 %	11.00 %	3.00 %	14.00 %
2013	2016	117,370	4,746	40,433	1.2 %	3.49 %	6.51 %	10.00 %	4.00 %	14.00 %
2014	2017	118,114	4,826	40,862	1.1 %	3.40 %	6.60 %	10.00 %	4.00 %	14.00 %
2015@	2018	118,372	4,961	41,911	2.6 %	4.09 %	9.91 %	14.00 %	0.00 %	14.00 %
2016	2019	119,223	5,131	43,037	2.7 %	4.03 %	9.97 %	14.00 %	0.00 %	14.00 %
2017	2020	121,199	5,285	43,610	1.3 %	4.07 %	9.93 %	14.00 %	0.00 %	14.00 %
2018^	2021	102,165	5,189	50,795	16.5 %	4.78 %	9.22 %	14.00 %	0.00 %	14.00 %
2019	2022	103,162	5,375	52,101	2.6 %	4.74 %	9.26 %	14.00 %	0.00 %	14.00 %

# After benefit changes.

@ Revised actuarial assumptions.

^ Reflects active members reclassified as inactive.

**STATE DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2019**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 27,341,323,467	\$ -	\$ 27,341,323,467
Allowances currently being paid from the Survivors Benefit Fund	761,863,421	-	761,863,421
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	17,242,855,160	3,624,978,768	13,617,876,392
Disability allowances likely to be paid present active members who become permanently disabled	1,646,975,571	747,650,654	899,324,917
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	422,981,958	140,468,963	282,512,995
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,805,574,870	1,912,860,645	892,714,225
Total	\$ 50,221,574,447	\$ 6,425,959,030	\$ 43,795,615,417
Funding Value of Assets			33,785,361,067
Unfunded Actuarial Accrued Liability			\$ 10,010,254,350

\* Includes contributions for administrative expenses.

**STATE DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization	
	Total	Average	Total	Assets		Years	
2005@	4,339	\$37,858	\$ 13,326	\$ 10,296	\$ 3,030	39	0.70
2006	4,522	39,005	14,006	12,131	1,875	35	0.41
2007	4,703	39,695	14,526	13,442	1,084	20	0.23
2008	4,780	41,590	14,872	7,488	7,384	N/A	1.54
2009	4,763	40,704	14,843	6,648	8,195	N/A	1.71
2010@	4,811	40,691	14,903	7,113	7,790	48	1.62
2011	4,844	40,952	14,754	6,616	8,138	37	1.68
2012#	4,690	39,938	13,135	5,270	7,865	37	1.68
2013	4,746	40,433	13,125	6,572	6,553	32	1.38
2014	4,826	40,862	12,951	5,631	7,320	40	1.52
2015@	4,961	41,911	13,788	5,550	8,238	24	1.66
2016	5,131	43,037	14,090	5,587	8,503	24	1.66
2017	5,285	43,610	14,300	5,899	8,401	23	1.59
2018	5,189	50,795	15,280	4,784	10,496	35	2.02
2019	5,375	52,101	15,694	5,684	10,010	29	1.86

# After benefit changes.

@ Revised actuarial assumptions.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll ("UNFUNDED/PAYROLL" above) is significant. Unfunded actuarial accrued liabilities represent plan debt, while active member payroll represents the plan's capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**STATE DIVISION**  
**Male Active Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	657							657
Tot. Pay	\$6,857,671							\$6,857,671
Avg. Pay	\$10,438							\$10,438
20-24	5,391	16						5,407
Tot. Pay	\$95,154,067	\$692,524						\$95,846,591
Avg. Pay	\$17,651	\$43,283						\$17,726
25-29	4,044	667	9					4,720
Tot. Pay	\$148,267,432	\$33,600,599	\$415,126					\$182,283,157
Avg. Pay	\$36,664	\$50,376	\$46,125					\$38,619
30-34	2,825	1,584	440	15				4,864
Tot. Pay	\$120,852,037	\$91,007,392	\$27,356,437	\$877,515				\$240,093,381
Avg. Pay	\$42,779	\$57,454	\$62,174	\$58,501				\$49,361
35-39	1,822	1,175	1,147	447	15			4,606
Tot. Pay	\$82,607,638	\$71,397,540	\$76,117,449	\$29,987,456	\$1,022,727			\$261,132,810
Avg. Pay	\$45,339	\$60,764	\$66,362	\$67,086	\$68,182			\$56,694
40-44	1,294	898	912	927	396	6		4,433
Tot. Pay	\$58,361,176	\$54,697,178	\$62,996,858	\$67,164,393	\$28,237,712	\$398,363		\$271,855,680
Avg. Pay	\$45,101	\$60,910	\$69,076	\$72,453	\$71,307	\$66,394		\$61,325
45-49	1,117	791	714	838	1,110	409	6	4,985
Tot. Pay	\$49,613,984	\$47,377,819	\$49,312,986	\$61,071,264	\$81,894,420	\$31,627,374	\$637,868	\$321,535,715
Avg. Pay	\$44,417	\$59,896	\$69,066	\$72,877	\$73,779	\$77,329	\$106,311	\$64,501
50-54	935	682	601	724	920	1,270	337	5,469
Tot. Pay	\$40,493,792	\$42,529,356	\$40,524,165	\$52,442,623	\$68,117,601	\$103,466,265	\$27,719,215	\$375,293,017
Avg. Pay	\$43,309	\$62,360	\$67,428	\$72,435	\$74,041	\$81,470	\$82,253	\$68,622
55-59	787	579	536	673	786	952	803	5,116
Tot. Pay	\$30,697,780	\$34,921,731	\$35,038,481	\$46,952,179	\$55,207,513	\$73,497,665	\$68,026,838	\$344,342,187
Avg. Pay	\$39,006	\$60,314	\$65,370	\$69,765	\$70,239	\$77,203	\$84,716	\$67,307
60-64	533	363	409	505	537	610	546	3,503
Tot. Pay	\$17,723,925	\$22,033,166	\$26,965,897	\$35,188,978	\$37,966,624	\$46,955,928	\$44,820,676	\$231,655,194
Avg. Pay	\$33,253	\$60,697	\$65,931	\$69,681	\$70,701	\$76,977	\$82,089	\$66,131
65-69	320	168	170	191	179	201	257	1,486
Tot. Pay	\$8,757,207	\$9,969,665	\$10,672,447	\$13,891,877	\$13,676,207	\$14,660,391	\$21,689,872	\$93,317,666
Avg. Pay	\$27,366	\$59,343	\$62,779	\$72,732	\$76,403	\$72,937	\$84,396	\$62,798
70 & Over	249	69	56	57	56	50	88	625
Tot. Pay	\$3,346,995	\$2,854,029	\$3,048,270	\$3,674,057	\$3,961,182	\$3,667,462	\$7,490,861	\$28,042,856
Avg. Pay	\$13,442	\$41,363	\$54,433	\$64,457	\$70,735	\$73,349	\$85,123	\$44,869
<b>Totals</b>	19,974	6,992	4,994	4,377	3,999	3,498	2,037	45,871
<b>Tot. Pay</b>	\$662,733,704	\$411,080,999	\$332,448,116	\$311,250,342	\$290,083,986	\$274,273,448	\$170,385,330	\$2,452,255,925
<b>Avg. Pay</b>	\$33,180	\$58,793	\$66,570	\$71,110	\$72,539	\$78,409	\$83,645	\$53,460



**STATE DIVISION**  
**Female Active Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1,117							1,117
Tot. Pay	\$10,211,590							\$10,211,590
Avg. Pay	\$9,142							\$9,142
20-24	7,189	15						7,204
Tot. Pay	\$120,230,287	\$486,028						\$120,716,315
Avg. Pay	\$16,724	\$32,402						\$16,757
25-29	5,301	771	7					6,079
Tot. Pay	\$206,171,293	\$38,847,822	\$324,355					\$245,343,470
Avg. Pay	\$38,893	\$50,386	\$46,336					\$40,359
30-34	3,675	2,058	497	9				6,239
Tot. Pay	\$157,531,731	\$118,301,477	\$30,172,313	\$599,383				\$306,604,904
Avg. Pay	\$42,866	\$57,484	\$60,709	\$66,598				\$49,143
35-39	2,415	1,581	1,330	501	12			5,839
Tot. Pay	\$109,152,061	\$93,670,654	\$87,659,411	\$33,758,249	\$633,928			\$324,874,303
Avg. Pay	\$45,198	\$59,248	\$65,909	\$67,382	\$52,827			\$55,639
40-44	1,906	1,098	1,039	1,127	394	10		5,574
Tot. Pay	\$88,926,057	\$65,014,615	\$69,240,546	\$80,976,137	\$27,522,992	\$703,668		\$332,384,015
Avg. Pay	\$46,656	\$59,212	\$66,642	\$71,851	\$69,855	\$70,367		\$59,631
45-49	1,701	1,043	964	891	1,062	399	13	6,073
Tot. Pay	\$79,787,665	\$65,320,680	\$66,343,000	\$63,741,820	\$77,658,057	\$29,787,560	\$858,139	\$383,496,921
Avg. Pay	\$46,906	\$62,628	\$68,821	\$71,540	\$73,124	\$74,656	\$66,011	\$63,148
50-54	1,326	886	851	888	939	1,192	395	6,477
Tot. Pay	\$59,406,831	\$53,463,748	\$55,633,947	\$61,261,871	\$65,662,559	\$92,325,373	\$29,992,472	\$417,746,801
Avg. Pay	\$44,802	\$60,343	\$65,375	\$68,989	\$69,928	\$77,454	\$75,930	\$64,497
55-59	957	739	867	874	902	1,015	821	6,175
Tot. Pay	\$43,350,827	\$44,378,244	\$53,624,258	\$55,954,858	\$57,612,820	\$72,919,636	\$64,102,359	\$391,943,002
Avg. Pay	\$45,299	\$60,052	\$61,850	\$64,022	\$63,872	\$71,842	\$78,078	\$63,473
60-64	602	500	677	790	753	697	529	4,548
Tot. Pay	\$22,933,496	\$29,205,616	\$41,558,471	\$47,504,884	\$48,337,110	\$47,988,146	\$39,601,913	\$277,129,636
Avg. Pay	\$38,096	\$58,411	\$61,386	\$60,133	\$64,193	\$68,850	\$74,862	\$60,934
65-69	160	146	239	283	250	225	188	1,491
Tot. Pay	\$4,425,370	\$8,319,462	\$14,410,273	\$17,152,797	\$16,167,871	\$15,345,165	\$13,909,744	\$89,730,682
Avg. Pay	\$27,659	\$56,983	\$60,294	\$60,611	\$64,671	\$68,201	\$73,988	\$60,182
70 & Over	102	52	41	75	57	62	86	475
Tot. Pay	\$1,528,158	\$1,881,041	\$1,988,332	\$3,762,456	\$3,435,368	\$3,985,135	\$5,829,145	\$22,409,635
Avg. Pay	\$14,982	\$36,174	\$48,496	\$50,166	\$60,270	\$64,276	\$67,781	\$47,178
<b>Totals</b>	26,451	8,889	6,512	5,438	4,369	3,600	2,032	57,291
<b>Tot. Pay</b>	\$903,655,366	\$518,889,387	\$420,954,906	\$364,712,455	\$297,030,705	\$263,054,683	\$154,293,772	\$2,922,591,274
<b>Avg. Pay</b>	\$34,163	\$58,374	\$64,643	\$67,067	\$67,986	\$73,071	\$75,932	\$51,013



**STATE DIVISION**  
**Inactive Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20	797							797
20-24	35,555	2						35,557
25-29	51,735	239						51,974
30-34	65,841	995	55	1				66,892
35-39	38,124	1,265	315	36				39,740
40-44	30,147	1,063	422	129	10			31,771
45-49	22,057	914	425	199	68	8		23,671
50-54	12,715	1,018	545	236	147	53	2	14,716
55-59	9,043	1,082	724	368	198	52	12	11,479
60-64	7,096	833	567	284	108	20	7	8,915
65-69	4,316	298	128	81	33	9	4	4,869
70 & Over	1,534	78	27	9	4	4	3	1,659
<b>Totals</b>	<b>278,960</b>	<b>7,787</b>	<b>3,208</b>	<b>1,343</b>	<b>568</b>	<b>146</b>	<b>28</b>	<b>292,040</b>

## **SECTION VI**

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### **LOCAL GOVERNMENT DIVISION**

## LOCAL GOVERNMENT DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Defined Benefit Active Members in Valuation December 31, 2019*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
<b>Traditional Plan</b>					
Men	81,393	\$ 3,783,647,023	\$ 46,486	46.7 yrs.	10.8 yrs.
Women	95,936	3,984,182,036	41,530	45.8	10.7
Traditional Plan Total	177,329	\$ 7,767,829,059	\$ 43,805	46.2 yrs.	10.7 yrs.
<b>Combined Plan</b>					
Men	2,121	\$ 122,508,353	\$ 57,760	47.4 yrs.	9.5 yrs.
Women	2,659	134,676,282	50,649	46.3	9.3
Combined Plan Total	4,780	\$ 257,184,635	\$ 53,804	46.7 yrs.	9.4 yrs.
<b>Grand Total</b>	<b>182,109</b>	<b>\$ 8,025,013,694</b>	<b>\$ 44,067</b>	<b>46.2 yrs.</b>	<b>10.7 yrs.</b>

Also included in the valuation were 342,394 inactive members and 16,082 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2019*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
<b>Traditional Plan</b>			
A & PR Fund			
Superannuation Retirement	116,030	\$ 253,648,453	\$ 34,235,152,296
Disability Retirement	10,742	26,341,304	3,538,421,188
Money Purchase	3,170	1,322,660	135,333,306
Total A & PR Fund	129,942	\$ 281,312,417	\$ 37,908,906,790
Total SBF	9,549	10,173,169	1,234,088,886
Traditional Plan Total	139,491	\$ 291,485,586	\$ 39,142,995,676
<b>Combined Plan</b>			
A & PR Fund			
CB (DB)	269	\$ 105,726	\$ 15,158,721
CA (DC)	188	57,592	8,504,728
Total A & PR Fund	457	\$ 163,318	\$ 23,663,449
Combined Plan Total	457	\$ 163,318	\$ 23,663,449
<b>Member Directed Plan</b>			
A & PR Fund			
Reserve for Future Adverse Experience	230	\$ 95,656	\$ 13,728,873
Member Directed Plan Total	230	\$ 95,656	\$ 15,232,820
<b>Grand Total</b>	<b>140,178</b>	<b>\$ 291,744,560</b>	<b>\$ 39,181,891,945</b>

**LOCAL GOVERNMENT DIVISION**  
**Employer Contributions to Support**  
**Defined Benefit Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2019			2018
Contributions for	2022			2021
Normal Cost	<u>Traditional Plan</u>	<u>Combined Plan</u>	<u>Traditional and Combined Plans</u>	<u>Traditional and Combined Plans</u>
Age and Service Allowances*	8.74 %	4.89 %	8.62 %	8.67 %
Disability Allowances	1.39 %	1.28 %	1.38 %	1.38 %
Survivor's Benefits	0.43 %	0.36 %	0.42 %	0.43 %
Separation Benefits	3.88 %	1.05 %	3.79 %	3.79 %
Total Normal Cost	14.44 %	7.58 %	14.21 %	14.27 %
(Member Contributions)	10.00 %	0.00 %	9.63 %	9.63 %
Employer Normal Cost	4.44 %	7.58 %	4.58 %	4.64 %
<b>Unfunded Actuarial Accrued Liabilities</b>				
Total Available Contribution	9.56 %	6.42 %	9.42 %	9.36 %
Amortization Years	20	0	20	24
<b>Total Pension Employer Contribution Rate</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>	<b>14.00 %</b>

\* Includes contributions for administrative expenses.

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## LOCAL GOVERNMENT DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Defined Benefit Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Millions)							
2005@	2008	236,073	\$ 7,066	\$ 29,933	2.8 %	5.00 %	2.00 %	7.00 %	7.00 %	14.00 %
2006	2009	237,981	7,234	30,399	1.6 %	4.53 %	2.47 %	7.00 %	7.00 %	14.00 %
2007	2010	237,225	7,438	31,354	3.1 %	5.12 %	1.88 %	7.00 %	7.00 %	14.00 %
2008	2011	233,163	7,566	32,451	3.5 %	5.14 %	4.86 %	10.00 %	4.00 %	14.00 %
2009	2012	223,004	7,334	32,889	1.3 %	5.14 %	4.86 %	10.00 %	4.00 %	14.00 %
2010@	2013	215,144	7,196	33,447	1.7 %	5.12 %	7.88 %	13.00 %	1.00 %	14.00 %
2011	2014	209,452	7,115	33,968	1.6 %	5.14 %	8.86 %	14.00 %	0.00 %	14.00 %
2012#	2015	208,188	7,061	33,918	(0.1)%	3.13 %	7.87 %	11.00 %	3.00 %	14.00 %
2013	2016	207,416	7,134	34,396	1.4 %	3.16 %	6.84 %	10.00 %	4.00 %	14.00 %
2014	2017	203,955	7,360	36,087	4.9 %	3.06 %	6.94 %	10.00 %	4.00 %	14.00 %
2015@	2018	202,779	7,505	37,008	2.6 %	3.91 %	10.09 %	14.00 %	0.00 %	14.00 %
2016	2019	203,767	7,800	38,279	3.4 %	3.85 %	10.15 %	14.00 %	0.00 %	14.00 %
2017	2020	201,953	7,929	39,263	2.6 %	3.89 %	10.11 %	14.00 %	0.00 %	14.00 %
2018^	2021	182,306	7,836	42,984	9.5 %	4.64 %	9.36 %	14.00 %	0.00 %	14.00 %
2019	2022	182,109	8,025	44,067	2.5 %	4.58 %	9.42 %	14.00 %	0.00 %	14.00 %

# After benefit changes.

@ Revised actuarial assumptions.

^ Reflects active members reclassified as inactive.

**LOCAL GOVERNMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2019**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 37,947,803,059	\$ -	\$ 37,947,803,059
Allowances currently being paid from the Survivors Benefit Fund	1,234,088,886	-	1,234,088,886
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	26,152,657,698	5,750,836,395	20,401,821,303
Disability allowances likely to be paid present active members who become permanently disabled	1,889,856,234	916,433,735	973,422,499
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	757,195,558	262,964,670	494,230,888
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	4,141,290,281	2,646,988,946	1,494,301,335
<b>Total</b>	<b>\$ 72,122,891,716</b>	<b>\$ 9,577,223,746</b>	<b>\$ 62,545,667,970</b>
Funding Value of Assets			50,513,856,007
Unfunded Actuarial Accrued Liability			<b>\$ 12,031,811,963</b>

\* Includes contributions for administrative expenses.

**LOCAL GOVERNMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization Years	
	Total	Average	Total	Assets			
2005@	\$ 7,066	\$29,933	\$ 19,484	\$ 14,921	\$4,563	25	0.65
2006	7,234	30,399	20,147	17,523	2,624	19	0.36
2007	7,438	31,354	20,838	19,656	1,182	9	0.16
2008	7,566	32,451	21,590	11,561	10,029	N/A	1.33
2009	7,334	32,889	21,620	11,599	10,021	N/A	1.37
2010@	7,196	33,447	21,668	13,212	8,456	22	1.18
2011	7,115	33,968	21,631	11,418	10,213	25	1.44
2012#	7,061	33,918	19,583	11,981	7,602	15	1.08
2013	7,134	34,396	19,586	11,440	8,146	20	1.14
2014	7,360	36,087	19,656	13,066	6,590	13	0.90
2015@	7,505	37,008	20,867	10,620	10,247	16	1.37
2016	7,800	38,279	21,422	10,699	10,723	17	1.37
2017	7,929	39,263	21,605	11,273	10,332	16	1.30
2018	7,836	42,984	22,942	9,874	13,068	24	1.67
2019	8,025	44,067	23,366	11,334	12,032	20	1.50

# After benefit changes.

@ Revised actuarial assumptions.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll (“UNFUNDED/PAYROLL” above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan’s capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**LOCAL GOVERNMENT DIVISION**  
**Male Active Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1,941							1,941
Tot. Pay	\$20,787,974							\$20,787,974
Avg. Pay	\$10,710							\$10,710
20-24	4,303	66						4,369
Tot. Pay	\$105,899,611	\$2,451,505						\$108,351,116
Avg. Pay	\$24,611	\$37,144						\$24,800
25-29	4,894	1,112	30					6,036
Tot. Pay	\$170,251,064	\$50,570,821	\$1,501,419					\$222,323,304
Avg. Pay	\$34,788	\$45,477	\$50,047					\$36,833
30-34	4,060	2,346	716	46				7,168
Tot. Pay	\$160,987,917	\$119,900,937	\$40,012,413	\$2,532,730				\$323,433,997
Avg. Pay	\$39,652	\$51,109	\$55,883	\$55,059				\$45,122
35-39	3,246	1,958	1,667	797	68			7,736
Tot. Pay	\$127,161,962	\$102,320,120	\$96,921,271	\$48,463,732	\$3,799,411			\$378,666,496
Avg. Pay	\$39,175	\$52,257	\$58,141	\$60,808	\$55,874			\$48,949
40-44	2,671	1,580	1,439	1,641	813	38		8,182
Tot. Pay	\$103,833,707	\$81,055,110	\$84,921,802	\$105,795,864	\$53,058,372	\$2,443,594		\$431,108,449
Avg. Pay	\$38,874	\$51,301	\$59,014	\$64,470	\$65,262	\$64,305		\$52,690
45-49	2,631	1,504	1,378	1,559	1,719	695	34	9,520
Tot. Pay	\$97,078,984	\$76,907,395	\$78,562,347	\$101,038,922	\$116,887,159	\$47,856,873	\$2,408,867	\$520,740,547
Avg. Pay	\$36,898	\$51,135	\$57,012	\$64,810	\$67,997	\$68,859	\$70,849	\$54,700
50-54	2,312	1,381	1,354	1,502	1,726	1,683	550	10,508
Tot. Pay	\$82,538,663	\$67,664,759	\$72,841,031	\$92,683,466	\$119,399,296	\$120,708,790	\$39,689,136	\$595,525,141
Avg. Pay	\$35,700	\$48,997	\$53,797	\$61,707	\$69,177	\$71,722	\$72,162	\$56,674
55-59	2,099	1,282	1,312	1,461	1,665	1,622	1,149	10,590
Tot. Pay	\$70,310,893	\$60,256,935	\$66,786,778	\$83,870,384	\$107,254,053	\$110,616,927	\$84,538,160	\$583,634,130
Avg. Pay	\$33,497	\$47,002	\$50,905	\$57,406	\$64,417	\$68,198	\$73,575	\$55,112
60-64	1,920	1,202	1,095	1,230	1,348	1,163	941	8,899
Tot. Pay	\$51,572,209	\$49,423,140	\$51,548,163	\$66,397,395	\$82,544,690	\$75,948,010	\$69,179,161	\$446,612,768
Avg. Pay	\$26,861	\$41,117	\$47,076	\$53,982	\$61,235	\$65,304	\$73,517	\$50,187
65-69	1,564	729	557	581	531	462	469	4,893
Tot. Pay	\$28,304,519	\$23,844,491	\$23,754,160	\$28,499,299	\$29,475,851	\$27,773,329	\$33,264,155	\$194,915,804
Avg. Pay	\$18,098	\$32,708	\$42,647	\$49,052	\$55,510	\$60,115	\$70,926	\$39,836
70 & Over	1,637	681	467	307	212	156	212	3,672
Tot. Pay	\$22,070,634	\$11,676,284	\$10,805,998	\$9,281,674	\$7,860,812	\$6,861,085	\$11,499,163	\$80,055,650
Avg. Pay	\$13,482	\$17,146	\$23,139	\$30,233	\$37,079	\$43,981	\$54,241	\$21,802
<b>Totals</b>	<b>33,278</b>	<b>13,841</b>	<b>10,015</b>	<b>9,124</b>	<b>8,082</b>	<b>5,819</b>	<b>3,355</b>	<b>83,514</b>
<b>Tot. Pay</b>	<b>\$1,040,798,137</b>	<b>\$646,071,497</b>	<b>\$527,655,382</b>	<b>\$538,563,466</b>	<b>\$520,279,644</b>	<b>\$392,208,608</b>	<b>\$240,578,642</b>	<b>\$3,906,155,376</b>
<b>Avg. Pay</b>	<b>\$31,276</b>	<b>\$46,678</b>	<b>\$52,687</b>	<b>\$59,027</b>	<b>\$64,375</b>	<b>\$67,401</b>	<b>\$71,707</b>	<b>\$46,772</b>





**LOCAL GOVERNMENT DIVISION**  
**Female Active Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	2,070							2,070
Tot. Pay	\$19,797,669							\$19,797,669
Avg. Pay	\$9,564							\$9,564
20-24	4,419	68						4,487
Tot. Pay	\$94,908,321	\$1,936,150						\$96,844,471
Avg. Pay	\$21,477	\$28,473						\$21,583
25-29	6,860	1,158	44					8,062
Tot. Pay	\$229,259,011	\$46,536,374	\$1,669,204					\$277,464,589
Avg. Pay	\$33,420	\$40,187	\$37,936					\$34,416
30-34	5,478	2,841	669	50				9,038
Tot. Pay	\$195,753,731	\$131,075,861	\$31,065,408	\$2,299,314				\$360,194,314
Avg. Pay	\$35,735	\$46,137	\$46,436	\$45,986				\$39,853
35-39	4,402	2,385	1,963	824	72			9,646
Tot. Pay	\$156,121,295	\$111,482,764	\$102,206,417	\$42,886,415	\$3,609,327			\$416,306,218
Avg. Pay	\$35,466	\$46,743	\$52,066	\$52,047	\$50,130			\$43,158
40-44	3,748	1,842	1,763	2,022	925	54		10,354
Tot. Pay	\$129,547,493	\$86,613,605	\$93,321,928	\$114,509,057	\$51,785,133	\$3,076,917		\$478,854,133
Avg. Pay	\$34,564	\$47,022	\$52,934	\$56,632	\$55,984	\$56,980		\$46,248
45-49	3,682	1,767	1,572	1,878	2,218	844	47	12,008
Tot. Pay	\$123,160,037	\$78,977,141	\$79,408,485	\$104,626,496	\$131,914,733	\$49,584,158	\$2,633,999	\$570,305,049
Avg. Pay	\$33,449	\$44,696	\$50,514	\$55,712	\$59,475	\$58,749	\$56,043	\$47,494
50-54	3,230	1,755	1,654	1,831	1,973	1,810	713	12,966
Tot. Pay	\$104,145,553	\$74,313,051	\$78,587,405	\$97,868,408	\$114,344,557	\$113,799,345	\$42,412,994	\$625,471,313
Avg. Pay	\$32,243	\$42,344	\$47,514	\$53,451	\$57,955	\$62,873	\$59,485	\$48,239
55-59	2,698	1,671	1,664	1,954	2,033	1,732	1,205	12,957
Tot. Pay	\$79,952,966	\$65,106,067	\$71,599,034	\$96,092,774	\$108,550,244	\$100,602,654	\$77,192,711	\$599,096,450
Avg. Pay	\$29,634	\$38,962	\$43,028	\$49,177	\$53,394	\$58,085	\$64,060	\$46,237
60-64	1,939	1,295	1,360	1,768	1,859	1,421	855	10,497
Tot. Pay	\$50,507,475	\$47,327,014	\$55,745,257	\$80,345,650	\$92,742,128	\$78,711,746	\$51,718,928	\$457,098,198
Avg. Pay	\$26,048	\$36,546	\$40,989	\$45,444	\$49,888	\$55,392	\$60,490	\$43,546
65-69	984	527	581	686	653	558	364	4,353
Tot. Pay	\$17,028,278	\$16,484,278	\$21,720,845	\$29,724,562	\$30,280,042	\$27,916,055	\$21,123,948	\$164,278,008
Avg. Pay	\$17,305	\$31,279	\$37,385	\$43,330	\$46,371	\$50,029	\$58,033	\$37,739
70 & Over	785	312	228	228	232	178	194	2,157
Tot. Pay	\$8,983,492	\$5,050,303	\$5,712,422	\$7,152,712	\$8,639,005	\$7,797,168	\$9,812,804	\$53,147,906
Avg. Pay	\$11,444	\$16,187	\$25,054	\$31,372	\$37,237	\$43,804	\$50,581	\$24,640
<b>Totals</b>	40,295	15,621	11,498	11,241	9,965	6,597	3,378	98,595
<b>Tot. Pay</b>	\$1,209,165,321	\$664,902,608	\$541,036,405	\$575,505,388	\$541,865,169	\$381,488,043	\$204,895,384	\$4,118,858,318
<b>Avg. Pay</b>	\$30,008	\$42,565	\$47,055	\$51,197	\$54,377	\$57,828	\$60,656	\$41,776

**LOCAL GOVERNMENT DIVISION**  
**Inactive Members in Defined Benefit Valuation**  
**December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20	5,447							5,447
20-24	38,550	9						38,559
25-29	40,690	384	2					41,076
30-34	45,228	1,174	96	1				46,499
35-39	41,266	1,586	474	81	1			43,408
40-44	36,723	1,592	715	281	33			39,344
45-49	30,559	1,799	876	475	200	34		33,943
50-54	23,293	1,900	1,093	566	307	108	6	27,273
55-59	20,643	2,190	1,426	742	439	109	10	25,559
60-64	18,841	1,910	1,253	637	307	54	17	23,019
65-69	12,114	853	336	143	60	21	9	13,536
70 & Over	4,319	231	88	57	20	8	8	4,731
<b>Totals</b>	<b>317,673</b>	<b>13,628</b>	<b>6,359</b>	<b>2,983</b>	<b>1,367</b>	<b>334</b>	<b>50</b>	<b>342,394</b>

## **SECTION VII**

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### **PUBLIC SAFETY DIVISION**

## PUBLIC SAFETY DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Active Members in Valuation December 31, 2019*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	47	\$ 2,481,474	\$ 52,797	41.7 yrs.	11.7 yrs.
Women	12	576,274	48,023	39.7	9.2
<b>Totals</b>	<b>59</b>	<b>\$ 3,057,748</b>	<b>\$ 51,826</b>	<b>41.3 yrs.</b>	<b>11.2 yrs.</b>

Also included in the valuation were 57 inactive members and 0 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2019*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	33	\$ 67,327	\$ 10,439,476
Disability Retirement	36	124,712	18,224,863
Money Purchase	0	0	0
Total A & PR Fund	69	\$ 192,039	\$ 28,664,339
Total SBF	121	181,086	25,112,060
<b>Grand Total</b>	<b>190</b>	<b>\$ 373,125</b>	<b>\$ 53,776,399</b>

**PUBLIC SAFETY DIVISION**  
**Employer Contributions to Support**  
**Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2019	2018
Contributions for	2022	2021
<b>Normal Cost</b>		
Age and Service Allowances*	9.59 %	9.57 %
Disability Allowances	3.27 %	3.25 %
Survivor's Benefits	0.49 %	0.47 %
Separation Benefits	5.23 %	5.22 %
Total Normal Cost	18.58 %	18.51 %
(Member Contributions)	12.00 %	12.00 %
Employer Normal Cost	6.58 %	6.51 %
<b>Unfunded Actuarial Accrued Liabilities</b>		
Total Available Contribution	11.52 %	11.59 %
Amortization Years	N/A	N/A
<b>Total Pension Employer Contribution Rate</b>	<b>18.10 %</b>	<b>18.10 %</b>

\* Includes contributions for administrative expenses.

N/A The unfunded actuarial accrued liabilities are unable to be amortized based upon the total pension contribution rate.

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## PUBLIC SAFETY DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Thousands)							
2010@	2013	88	\$ 3,650	\$ 41,480	(4.0)%	6.22 %	10.88 %	17.10 %	1.00 %	18.10 %
2011	2014	84	3,629	43,202	4.2 %	6.12 %	11.98 %	18.10 %	0.00 %	18.10 %
2012#	2015	87	3,751	43,119	(0.2)%	3.96 %	11.14 %	15.10 %	3.00 %	18.10 %
2013	2016	85	3,684	43,338	0.5 %	4.11 %	9.99 %	14.10 %	4.00 %	18.10 %
2014	2017	86	3,823	44,452	2.6 %	4.16 %	9.94 %	14.10 %	4.00 %	18.10 %
2015@	2018	79	3,620	45,817	3.1 %	5.24 %	12.86 %	18.10 %	0.00 %	18.10 %
2016	2019	76	3,401	44,752	(2.3)%	5.45 %	12.65 %	18.10 %	0.00 %	18.10 %
2017	2020	75	3,640	48,539	8.5 %	5.42 %	12.68 %	18.10 %	0.00 %	18.10 %
2018^	2021	61	3,004	49,253	1.5 %	6.51 %	11.59 %	18.10 %	0.00 %	18.10 %
2019	2022	59	3,058	51,826	5.2 %	6.58 %	11.52 %	18.10 %	0.00 %	18.10 %

# After benefit changes.

@ Revised actuarial assumptions.

^ Reflects active members reclassified as inactive.

**PUBLIC SAFETY DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2019**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 28,664,339	\$ -	\$ 28,664,339
Allowances currently being paid from the Survivors Benefit Fund	25,112,060	-	25,112,060
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	10,056,945	2,267,547	7,789,398
Disability allowances likely to be paid present active members who become permanently disabled	1,702,452	756,107	946,345
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	259,589	99,533	160,056
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,444,158	1,280,366	1,163,792
<b>Total</b>	<b>\$ 68,239,543</b>	<b>\$ 4,403,553</b>	<b>\$ 63,835,990</b>
Funding Value of Assets			37,362,569
Unfunded Actuarial Accrued Liability			<b>\$ 26,473,421</b>

\* Includes contributions for administrative expenses.

**PUBLIC SAFETY DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization	
	Total	Average	Total	Assets		Years	
2010@	\$ 4	\$41,480	\$7	(7)	\$ 14	N/A	3.50
2011	4	43,202	8	(1)	9	45	2.25
2012#	4	43,119	7	(14)	21	N/A	5.25
2013	4	43,338	7	1	6	19	1.50
2014	4	44,452	8	(15)	23	N/A	5.75
2015@	4	45,817	8	(4)	12	82	3.00
2016	3	44,752	8	(7)	15	N/A	5.00
2017	4	48,539	9	(9)	18	N/A	4.50
2018	3	49,253	9	(15)	24	N/A	8.00
2019	3	51,826	10	(16)	26	N/A	8.67

# After benefit changes.

N/A The unfunded actuarial accrued liabilities are unable to be amortized based upon the total pension contribution rate.

@ Revised actuarial assumptions.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll (“UNFUNDED/PAYROLL” above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan’s capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.



**PUBLIC SAFETY DIVISION**  
**Male Active Members in Valuation December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19								
Tot. Pay								
Avg. Pay								
20-24	2							2
Tot. Pay	\$82,969							\$82,969
Avg. Pay	\$41,485							\$41,485
25-29	8							8
Tot. Pay	\$388,278							\$388,278
Avg. Pay	\$48,535							\$48,535
30-34	3	3						6
Tot. Pay	\$176,374	\$178,973						\$355,347
Avg. Pay	\$58,791	\$59,658						\$59,225
35-39	2	1	2					5
Tot. Pay	\$84,425	\$40,925	\$77,815					\$203,165
Avg. Pay	\$42,213	\$40,925	\$38,908					\$40,633
40-44		1	1	3				5
Tot. Pay		\$39,295	\$42,166	\$184,333				\$265,794
Avg. Pay		\$39,295	\$42,166	\$61,444				\$53,159
45-49	1		2	2	4			9
Tot. Pay	\$35,280		\$81,870	\$97,910	\$238,347			\$453,407
Avg. Pay	\$35,280		\$40,935	\$48,955	\$59,587			\$50,379
50-54				2		1	2	5
Tot. Pay				\$95,663		\$45,480	\$194,257	\$335,400
Avg. Pay				\$47,832		\$45,480	\$97,129	\$67,080
55-59			1	1		1		3
Tot. Pay			\$71,246	\$69,493		\$39,295		\$180,034
Avg. Pay			\$71,246	\$69,493		\$39,295		\$60,011
60-64	1					1		2
Tot. Pay	\$39,295					\$66,076		\$105,371
Avg. Pay	\$39,295					\$66,076		\$52,686
65-69			1					1
Tot. Pay			\$70,085					\$70,085
Avg. Pay			\$70,085					\$70,085
70 & Over			1					1
Tot. Pay			\$41,624					\$41,624
Avg. Pay			\$41,624					\$41,624
<b>Totals</b>	17	5	8	8	4	3	2	47
<b>Tot. Pay</b>	\$806,621	\$259,193	\$384,806	\$447,399	\$238,347	\$150,851	\$194,257	\$2,481,474
<b>Avg. Pay</b>	\$47,448	\$51,839	\$48,101	\$55,925	\$59,587	\$50,284	\$97,129	\$52,797

**PUBLIC SAFETY DIVISION**  
**Female Active Members in Valuation December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date						Total	
	0-4	5-9	10-14	15-19	20-24	25-29		30+
15-19								
Tot. Pay								
Avg. Pay								
20-24	1							1
Tot. Pay	\$49,966							\$49,966
Avg. Pay	\$49,966							\$49,966
25-29	3							3
Tot. Pay	\$140,300							\$140,300
Avg. Pay	\$46,767							\$46,767
30-34	1	1						2
Tot. Pay	\$37,699	\$47,023						\$84,722
Avg. Pay	\$37,699	\$47,023						\$42,361
35-39			1					1
Tot. Pay			\$42,174					\$42,174
Avg. Pay			\$42,174					\$42,174
40-44	1							1
Tot. Pay	\$39,295							\$39,295
Avg. Pay	\$39,295							\$39,295
45-49								
Tot. Pay								
Avg. Pay								
50-54						1		1
Tot. Pay						\$97,211		\$97,211
Avg. Pay						\$97,211		\$97,211
55-59		1					1	2
Tot. Pay		\$39,704					\$41,784	\$81,488
Avg. Pay		\$39,704					\$41,784	\$40,744
60-64		1						1
Tot. Pay		\$41,118						\$41,118
Avg. Pay		\$41,118						\$41,118
65-69								
Tot. Pay								
Avg. Pay								
70 & Over								
Tot. Pay								
Avg. Pay								
<b>Totals</b>	6	3	1			1	1	12
<b>Tot. Pay</b>	\$267,260	\$127,845	\$42,174			\$97,211	\$41,784	\$576,274
<b>Avg. Pay</b>	\$44,543	\$42,615	\$42,174			\$97,211	\$41,784	\$48,023

**PUBLIC SAFETY DIVISION**  
**Inactive Members in Valuation December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20								
20-24	1							1
25-29	13							13
30-34	11	2						13
35-39	10	1						11
40-44	7	2		1				10
45-49	4							4
50-54	2							2
55-59			1					1
60-64	1			1				2
65-69								
70 & Over								
<b>Totals</b>	<b>49</b>	<b>5</b>	<b>1</b>	<b>2</b>				<b>57</b>

## **SECTION VIII**

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### **LAW ENFORCEMENT DIVISION**

## LAW ENFORCEMENT DIVISION

Data on active, inactive, retired and money purchase members that was used in the valuation is tabulated briefly below.

### *Active Members in Valuation December 31, 2019*

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	7,088	\$ 500,249,038	\$ 70,577	41.6 yrs.	14.6 yrs.
Women	974	64,000,647	65,709	40.6	13.5
<b>Totals</b>	<b>8,062</b>	<b>\$ 564,249,685</b>	<b>\$ 69,989</b>	<b>41.5 yrs.</b>	<b>14.5 yrs.</b>

Also included in the valuation were 1,308 inactive members and 23 members active in the money purchase plan.

### *Retired Members in Valuation December 31, 2019*

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	3,389	\$ 12,757,790	\$ 1,962,471,546
Disability Retirement	1,619	5,482,687	777,882,790
Money Purchase	0	0	0
<b>Total A &amp; PR Fund</b>	<b>5,008</b>	<b>\$ 18,240,477</b>	<b>\$ 2,740,354,336</b>
<b>Total SBF</b>	<b>429</b>	<b>544,302</b>	<b>69,932,460</b>
<b>Grand Total</b>	<b>5,437</b>	<b>\$ 18,784,779</b>	<b>\$ 2,810,286,796</b>

**LAW ENFORCEMENT DIVISION**  
**Employer Contributions to Support**  
**Retirement Allowances**  
**Expressed as Percents of Active Member Payroll**

Valuation Date December 31	2019	2018
Contributions for	2022	2021
<b>Normal Cost</b>		
Age and Service Allowances*	14.43 %	14.47 %
Disability Allowances	3.51 %	3.51 %
Survivor's Benefits	0.50 %	0.50 %
Separation Benefits	2.61 %	2.61 %
Total Normal Cost	21.05 %	21.09 %
(Member Contributions)	13.00 %	13.00 %
Employer Normal Cost	8.05 %	8.09 %
<b>Unfunded Actuarial Accrued Liabilities</b>		
Total Available Contribution	10.05 %	10.01 %
Amortization Years	16	20
<b>Total Pension Employer Contribution Rate</b>	<b>18.10 %</b>	<b>18.10 %</b>

*\*Includes contributions for administrative expenses.*

The term "Amortization Years" refers to the period sufficient to produce the Total Employer Contribution Rate for retirement allowances and survivor benefits and incorporates all scheduled employer and member contribution rate increases and scheduled employer rate reallocations between the pension and retiree health programs.

## LAW ENFORCEMENT DIVISION Comparative Statement

Valuation Date December 31	Contribution Rate Effective January 1	Active Members in Valuation				Computed Employer Contributions as % of Payroll				
		No.	Annual Payroll			Normal Cost	Unfunded Accrued Liability	Pension Total	Retiree Health	Grand Total
			Total	Average	Increase					
			(\$Thousands)							
2005@	2008	7,976	\$ 395,189	\$ 49,547	3.0 %	9.65 %	0.75 %	10.40 %	7.00 %	17.40 %
2006	2009	8,092	413,182	51,061	3.1 %	9.65 %	0.98 %	10.63 %	7.00 %	17.63 %
2007	2010	8,265	437,223	52,901	3.6 %	9.95 %	0.92 %	10.87 %	7.00 %	17.87 %
2008	2011	8,173	448,694	54,900	3.8 %	8.43 %	5.67 %	14.10 %	4.00 %	18.10 %
2009	2012	8,006	447,232	55,862	1.8 %	8.16 %	5.94 %	14.10 %	4.00 %	18.10 %
2010@	2013	7,702	438,830	56,976	2.0 %	7.56 %	9.54 %	17.10 %	1.00 %	18.10 %
2011	2014	7,545	437,605	57,999	1.8 %	7.18 %	10.92 %	18.10 %	0.00 %	18.10 %
2012#	2015	7,470	438,500	58,702	1.2 %	5.43 %	9.67 %	15.10 %	3.00 %	18.10 %
2013	2016	7,549	447,612	59,294	1.0 %	5.44 %	8.66 %	14.10 %	4.00 %	18.10 %
2014	2017	7,618	463,653	60,863	2.6 %	5.34 %	8.76 %	14.10 %	4.00 %	18.10 %
2015@	2018	7,779	481,296	61,871	1.7 %	6.70 %	11.40 %	18.10 %	0.00 %	18.10 %
2016	2019	7,916	511,457	64,610	4.4 %	6.75 %	11.35 %	18.10 %	0.00 %	18.10 %
2017	2020	8,039	528,004	65,680	1.7 %	6.79 %	11.31 %	18.10 %	0.00 %	18.10 %
2018^	2021	8,015	543,649	67,829	3.3 %	8.09 %	10.01 %	18.10 %	0.00 %	18.10 %
2019	2022	8,062	564,250	69,989	3.2 %	8.05 %	10.05 %	18.10 %	0.00 %	18.10 %

# After benefit changes.

@ Revised actuarial assumptions.

^ Reflects active members reclassified as inactive.

**LAW ENFORCEMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**December 31, 2019**

Actuarial Present Value	(1) Total Actuarial Present Value	Allocation by Entry Age	
		(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Allowances currently being paid from the Annuity & Pension Reserve Fund	\$ 2,740,354,336	\$ -	\$ 2,740,354,336
Allowances currently being paid from the Survivors Benefit Fund	69,932,460	-	69,932,460
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	2,673,115,527	779,140,163	1,893,975,364
Disability allowances likely to be paid present active members who become permanently disabled	375,579,603	186,584,089	188,995,514
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	58,950,678	25,253,903	33,696,775
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	180,356,756	141,133,779	39,222,977
<b>Total</b>	<b>\$ 6,098,289,360</b>	<b>\$ 1,132,111,934</b>	<b>\$ 4,966,177,426</b>
Funding Value of Assets			4,235,137,474
Unfunded Actuarial Accrued Liability			<b>\$ 731,039,952</b>

\* Includes contributions for administrative expenses.



**LAW ENFORCEMENT DIVISION**  
**Development of Unfunded Actuarial Accrued Liabilities**  
**Comparative Statement**  
**(\$ in Millions Except Averages)**

Dec. 31	Defined Benefit Active Payroll		Active and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
			Computed	Valuation	Unfunded	Amortization	
	Total	Average	Total	Assets		Years	
2005@	\$395	\$49,547	\$ 1,298	\$ 926	\$ 372	N/A	0.94
2006	413	51,061	1,356	1,069	287	N/A	0.69
2007	437	52,901	1,430	1,214	216	N/A	0.49
2008	449	54,900	1,500	771	729	N/A	1.62
2009	447	55,862	1,534	807	727	N/A	1.63
2010@	439	56,976	1,542	966	576	19	1.31
2011	438	57,999	1,546	813	733	23	1.67
2012#	439	58,702	1,480	945	535	14	1.22
2013	448	59,294	1,510	981	529	15	1.18
2014	464	60,863	1,550	1,062	488	13	1.05
2015@	481	61,871	1,706	1,087	619	13	1.29
2016	511	64,610	1,818	1,172	646	13	1.26
2017	528	65,680	1,871	1,258	613	12	1.16
2018	544	67,829	2,048	1,219	829	20	1.52
2019	564	69,989	2,156	1,425	731	16	1.30

# After benefit changes.

@ Revised actuarial assumptions.

While no one or two numeric indices can fully describe the financial condition of a retirement plan, the ratio of unfunded actuarial accrued liabilities divided by active member payroll (“UNFUNDED/PAYROLL” above) is significant. Unfunded accrued liabilities represent plan debt, while active member payroll represents the plan’s capacity to collect contributions to pay toward debt --- thus the ratio is a relative index of condition. The lower the ratio, the greater the financial strength, and vice-versa.

**LAW ENFORCEMENT DIVISION**  
**Male Active Members in Valuation December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1							1
Tot. Pay	\$38,092							\$38,092
Avg. Pay	\$38,092							\$38,092
20-24	228	2						230
Tot. Pay	\$10,268,942	\$129,371						\$10,398,313
Avg. Pay	\$45,039	\$64,686						\$45,210
25-29	546	231	4					781
Tot. Pay	\$29,796,585	\$14,884,798	\$273,039					\$44,954,422
Avg. Pay	\$54,573	\$64,436	\$68,260					\$57,560
30-34	300	509	156	5				970
Tot. Pay	\$16,987,575	\$34,498,485	\$11,270,622	\$381,127				\$63,137,809
Avg. Pay	\$56,625	\$67,777	\$72,248	\$76,225				\$65,091
35-39	132	256	368	181	6			943
Tot. Pay	\$7,237,213	\$17,399,035	\$26,801,241	\$13,747,879	\$403,081			\$65,588,449
Avg. Pay	\$54,827	\$67,965	\$72,829	\$75,955	\$67,180			\$69,553
40-44	84	122	202	452	263	3		1,126
Tot. Pay	\$4,428,472	\$8,522,051	\$14,492,275	\$34,471,823	\$21,038,562	\$245,276		\$83,198,459
Avg. Pay	\$52,720	\$69,853	\$71,744	\$76,265	\$79,995	\$81,759		\$73,889
45-49	63	70	130	275	631	291	2	1,462
Tot. Pay	\$3,292,462	\$4,713,294	\$9,411,089	\$20,581,195	\$49,909,014	\$23,595,504	\$165,221	\$111,667,779
Avg. Pay	\$52,261	\$67,333	\$72,393	\$74,841	\$79,095	\$81,084	\$82,611	\$76,380
50-54	22	34	57	112	308	341	69	943
Tot. Pay	\$1,081,104	\$2,277,964	\$3,963,270	\$8,327,167	\$23,990,168	\$28,119,658	\$5,935,393	\$73,694,724
Avg. Pay	\$49,141	\$66,999	\$69,531	\$74,350	\$77,890	\$82,462	\$86,020	\$78,149
55-59	14	17	24	47	110	136	67	415
Tot. Pay	\$638,443	\$1,014,491	\$1,579,562	\$3,449,731	\$8,272,321	\$10,807,835	\$5,443,321	\$31,205,704
Avg. Pay	\$45,603	\$59,676	\$65,815	\$73,399	\$75,203	\$79,469	\$81,244	\$75,194
60-64	1	7	5	11	41	39	51	155
Tot. Pay	\$51,353	\$489,046	\$343,300	\$808,829	\$3,081,766	\$2,968,684	\$4,263,630	\$12,006,608
Avg. Pay	\$51,353	\$69,864	\$68,660	\$73,530	\$75,165	\$76,120	\$83,601	\$77,462
65-69	3	3	4	4	12	12	15	53
Tot. Pay	\$105,550	\$262,633	\$301,104	\$281,934	\$857,934	\$844,089	\$1,174,550	\$3,827,794
Avg. Pay	\$35,183	\$87,544	\$75,276	\$70,484	\$71,495	\$70,341	\$78,303	\$72,223
70 & Over	2	1	1	1	2		2	9
Tot. Pay	\$95,041	\$43,862	\$69,997	\$48,218	\$130,879		\$142,888	\$530,885
Avg. Pay	\$47,521	\$43,862	\$69,997	\$48,218	\$65,440		\$71,444	\$58,987
<b>Totals</b>	1,396	1,252	951	1,088	1,373	822	206	7,088
<b>Tot. Pay</b>	\$74,020,832	\$84,235,030	\$68,505,499	\$82,097,903	\$107,683,725	\$66,581,046	\$17,125,003	\$500,249,038
<b>Avg. Pay</b>	\$53,024	\$67,280	\$72,035	\$75,458	\$78,430	\$80,999	\$83,131	\$70,577



# LAW ENFORCEMENT DIVISION

## Female Active Members in Valuation December 31, 2019

### by Attained Age and Years of Service

Attained Ages	Years of Service To Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
15-19	1							1
Tot. Pay	\$43,068							\$43,068
Avg. Pay	\$43,068							\$43,068
20-24	51	1						52
Tot. Pay	\$2,354,035	\$52,336						\$2,406,371
Avg. Pay	\$46,158	\$52,336						\$46,276
25-29	104	36	1					141
Tot. Pay	\$5,296,854	\$2,154,445	\$76,172					\$7,527,471
Avg. Pay	\$50,931	\$59,846	\$76,172					\$53,386
30-34	42	65	16					123
Tot. Pay	\$2,389,904	\$4,283,469	\$1,026,771					\$7,700,144
Avg. Pay	\$56,902	\$65,900	\$64,173					\$62,603
35-39	17	28	54	27	2			128
Tot. Pay	\$817,061	\$1,861,106	\$4,102,840	\$1,878,443	\$124,165			\$8,783,615
Avg. Pay	\$48,062	\$66,468	\$75,979	\$69,572	\$62,083			\$68,622
40-44	11	13	28	60	36			148
Tot. Pay	\$690,201	\$737,206	\$1,911,113	\$4,324,148	\$2,727,739			\$10,390,407
Avg. Pay	\$62,746	\$56,708	\$68,254	\$72,069	\$75,771			\$70,205
45-49	5	18	21	25	77	29		175
Tot. Pay	\$327,558	\$1,240,049	\$1,579,783	\$1,822,797	\$5,716,426	\$2,326,706		\$13,013,319
Avg. Pay	\$65,512	\$68,892	\$75,228	\$72,912	\$74,239	\$80,231		\$74,362
50-54	4	5	10	14	47	35	8	123
Tot. Pay	\$208,502	\$352,944	\$665,490	\$892,615	\$3,206,723	\$2,527,459	\$620,254	\$8,473,987
Avg. Pay	\$52,126	\$70,589	\$66,549	\$63,758	\$68,228	\$72,213	\$77,532	\$68,894
55-59		1	5	12	14	17	3	52
Tot. Pay		\$53,148	\$314,526	\$757,808	\$1,126,844	\$1,087,273	\$221,303	\$3,560,902
Avg. Pay		\$53,148	\$62,905	\$63,151	\$80,489	\$63,957	\$73,768	\$68,479
60-64	1		2	3	8	4	7	25
Tot. Pay	\$80,301		\$93,839	\$178,772	\$579,996	\$322,978	\$486,221	\$1,742,107
Avg. Pay	\$80,301		\$46,920	\$59,591	\$72,500	\$80,745	\$69,460	\$69,684
65-69				2	1	1	2	6
Tot. Pay				\$131,343	\$53,440	\$68,590	\$105,883	\$359,256
Avg. Pay				\$65,672	\$53,440	\$68,590	\$52,942	\$59,876
70 & Over								
Tot. Pay								
Avg. Pay								
<b>Totals</b>	236	167	137	143	185	86	20	974
<b>Tot. Pay</b>	\$12,207,484	\$10,734,703	\$9,770,534	\$9,985,926	\$13,535,333	\$6,333,006	\$1,433,661	\$64,000,647
<b>Avg. Pay</b>	\$51,727	\$64,280	\$71,318	\$69,832	\$73,164	\$73,640	\$71,683	\$65,709

**LAW ENFORCEMENT DIVISION**  
**Inactive Members in Valuation December 31, 2019**  
**by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Total Number
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Under 20								
20-24	30							30
25-29	149	14						163
30-34	142	67	6					215
35-39	105	40	18	6				169
40-44	94	27	24	22	5			172
45-49	104	22	28	29	23	4		210
50-54	104	20	21	10	13	6		174
55-59	62	4	9	8	3	1		87
60-64	29	5	6	5	2	1	2	50
65-69	21	1		1			1	24
70 & Over	14							14
<b>Totals</b>	<b>854</b>	<b>200</b>	<b>112</b>	<b>81</b>	<b>46</b>	<b>12</b>	<b>3</b>	<b>1,308</b>

## **SECTION IX**

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### **ALLOWANCES BEING PAID TO RETIREES AND BENEFICIARIES**

## Monthly Allowances of Retired Lives by Year of Retirement as of December 31, 2019

Year of Retirement	No.	Initial	Post-Ret. Increase	Total	Average
2019	8,467	\$20,031,782	\$ 44,373	\$ 20,076,155	\$ 2,371
2018	8,254	17,786,013	571,304	18,357,317	2,224
2017	9,185	20,400,619	1,276,138	21,676,757	2,360
2016	8,302	17,643,578	1,658,529	19,302,107	2,325
2015	7,465	15,233,341	1,892,964	17,126,305	2,294
2014	11,799	21,407,955	3,250,373	24,658,328	2,090
2013	11,635	22,770,607	4,336,583	27,107,190	2,330
2012	10,624	21,888,510	4,652,156	26,540,666	2,498
2011	11,659	25,998,750	6,316,567	32,315,317	2,772
2010	10,394	21,305,709	5,809,065	27,114,774	2,609
2009	10,182	21,384,334	6,432,600	27,816,934	2,732
2008	8,786	16,896,073	5,594,542	22,490,615	2,560
2007	8,390	15,509,001	5,603,993	21,112,994	2,516
2006	8,778	15,467,599	6,036,465	21,504,064	2,450
2005	8,106	14,749,875	6,189,595	20,939,470	2,583
2004	7,530	12,914,200	5,801,940	18,716,140	2,486
2003	7,041	12,203,050	5,830,632	18,033,682	2,561
1998-2002	29,362	44,856,647	24,575,246	69,431,893	2,365
1993-1997	17,249	20,789,868	13,751,436	34,541,304	2,003
1988-1992	10,256	10,439,228	8,673,238	19,112,466	1,864
1983-1987	5,068	3,821,585	3,697,008	7,518,593	1,484
1978-1982	1,966	999,993	1,248,131	2,248,124	1,144
1973-1977	706	247,715	427,762	675,477	957
1968-1972	144	33,476	88,848	122,324	849
Before 1968	76	17,283	63,538	80,821	1,063
<b>TOTAL</b>	<b>221,424</b>	<b>\$394,796,791</b>	<b>\$123,823,026</b>	<b>\$518,619,817</b>	<b>\$2,342</b>

**Monthly Allowances of Retired Lives  
by Years of Service  
as of December 31, 2019**

<b>Years of Service</b>	<b>No.</b>	<b>Initial</b>	<b>Post-Ret. Increase</b>	<b>Total</b>	<b>Average</b>
<5 or n/a	8,832	\$ 3,341,934	\$ 509,250	\$ 3,851,184	\$ 436
5	4,066	1,574,749	541,993	2,116,742	521
6	3,341	1,491,929	486,034	1,977,963	592
7	3,298	1,607,478	502,109	2,109,587	640
8	3,199	1,738,954	543,563	2,282,517	714
9	2,561	1,568,691	421,851	1,990,542	777
10	9,081	4,833,158	1,671,746	6,504,904	716
11	5,700	3,686,492	1,144,697	4,831,189	848
12	5,787	3,980,904	1,228,924	5,209,828	900
13	5,486	4,287,808	1,299,443	5,587,251	1,018
14	5,221	4,307,435	1,304,768	5,612,203	1,075
15	5,702	5,098,501	1,555,874	6,654,375	1,167
16	5,396	5,068,423	1,592,133	6,660,556	1,234
17	5,029	5,208,206	1,597,367	6,805,573	1,353
18	5,048	5,477,926	1,701,717	7,179,643	1,422
19	4,688	5,316,135	1,770,174	7,086,309	1,512
20	6,745	8,769,221	2,456,001	11,225,222	1,664
21	5,471	7,432,856	2,281,242	9,714,098	1,776
22	5,239	7,656,774	2,362,884	10,019,658	1,913
23	5,097	7,914,558	2,458,925	10,373,483	2,035
24	4,868	8,039,374	2,457,441	10,496,815	2,156
25	10,488	18,900,843	6,096,270	24,997,113	2,383
26	6,278	12,111,870	3,984,858	16,096,728	2,564
27	6,180	12,813,967	4,359,707	17,173,674	2,779
28	6,812	15,494,541	5,555,057	21,049,598	3,090
29	6,440	15,775,969	5,426,550	21,202,519	3,292
30	33,782	91,425,454	27,448,957	118,874,411	3,519
31	9,984	28,756,244	8,525,877	37,282,121	3,734
32	7,375	21,894,029	6,861,475	28,755,504	3,899
33	5,610	17,388,257	5,397,837	22,786,094	4,062
34	4,329	13,700,399	4,492,600	18,192,999	4,203
35	3,916	12,634,495	4,139,150	16,773,645	4,283
36	2,759	9,081,072	2,944,059	12,025,131	4,359
37	2,186	7,172,763	2,406,540	9,579,303	4,382
38	1,567	5,198,812	1,696,881	6,895,693	4,401
39	1,194	3,916,679	1,392,260	5,308,939	4,446
40 & Over	2,669	10,129,891	3,206,812	13,336,703	4,997
<b>TOTAL</b>	<b>221,424</b>	<b>\$394,796,791</b>	<b>\$123,823,026</b>	<b>\$518,619,817</b>	<b>\$2,342</b>

# Annuity and Pension Reserve Fund

## Annual Allowance, Reported Assets and Actuarial Liabilities

### Comparative Statement

#### (\$ Millions)

Valuation Date	Annual Allowances			Reported Assets*	Actuarial Liabilities	Ratio of Assets to Liabilities	Ratio of DB Active to Retired
	No.	\$ Millions	% of DB Payroll				
12/31/1990	94,088	\$ 706	11.7 % **	\$ 7,438	\$ 7,338	101.4 %	3.0
12/31/1991	95,843	762	11.5 % **	8,014	7,904	101.4 %	3.4
12/31/1992	98,609	835	12.1 % **	8,814	8,692	101.4 %	3.4
12/31/1993	100,651	901	12.5 % **	9,390	9,356	100.4 %	3.4
12/31/1994	102,587	958	12.6 % **	9,964	9,893	100.7 %	3.3
12/31/1995	104,806	1,036	13.0 % **	10,808	10,737	100.7 %	3.3
12/31/1996@	107,617	1,141	13.7 % **	11,819	11,762	100.5 %	3.3
12/31/1997	110,470	1,233	14.3 % **	12,843	12,755	100.7 %	3.2
12/13/1998	113,000	1,327	14.7 % **	13,885	13,751	101.0 %	3.1
12/31/1999+	115,431	1,530	16.1 % **	14,978	16,139	92.8 %	3.1
12/31/2000	118,620	1,641	16.1 % **	16,980	16,980	100.0 %	3.1
12/31/2001@	121,875	1,775	16.5 % **	18,001	18,001	100.0 %	3.0
12/31/2002	126,409	1,958	17.5 % **	20,085	20,085	100.0 %	2.9
12/31/2003	130,433	2,136	19.1 % **	22,535	22,535	100.0 %	2.7
12/31/2004	134,535	2,311	20.2 % **	24,470	24,470	100.0 %	2.6
12/31/2005@	138,996	2,508	21.2 % **	27,084	27,084	100.0 %	2.6
12/31/2006	144,037	2,710	22.3 % **	29,304	29,304	100.0 %	2.5
12/31/2007	148,493	2,916	23.2 % **	31,547	31,547	100.0 %	2.5
12/31/2008	153,931	3,148	24.6 % **	34,060	34,060	100.0 %	2.3
12/31/2009	159,518	3,419	27.2 % **	37,098	37,098	100.0 %	2.2
12/31/2010@	166,247	3,705	29.8 % **	40,184	40,818	100.0 %	2.1
12/31/2011	174,679	4,065	32.8 % **	45,001	45,001	100.0 %	1.9
12/31/2012	180,759	4,352	35.7 % **	48,044	48,044	100.0 %	1.8
12/31/2013	187,198	4,629	37.5 % **	50,754	50,754	100.0 %	1.8
12/31/2014	194,096	4,908	38.8 % **	53,432	53,432	100.0 %	1.7
12/31/2015@	196,709	5,115	39.5 % **	55,117	55,117	100.0 %	1.7
12/31/2016	199,662	5,344	39.7 % **	60,949	60,949	100.0 %	1.7
12/31/2017	202,292	5,575	40.6 % **	62,931	62,931	100.0 %	1.6
12/31/2018	204,479	5,791	42.7 % **	66,395	66,395	100.0 %	1.4
12/31/2019	206,832	6,018	43.1 % **	68,058	68,058	100.0 %	1.4

\* Including certain recommended transfers and accrued transfers.

@ Revised actuarial assumptions.

\*\* Excluding health insurance and Medicare payments.

+ Including estimated effect of legislated benefit changes.



**Annuity and Pension Reserve Fund**  
**Retirees and Beneficiaries December 31, 2019**  
**Type of Benefit, Monthly Amount and Actuarial Liabilities**

Type of Allowance	Number	Current Total	Actuarial Liabilities
Superannuation Retirement			
Plan A - Joint & 50%	17,269	\$ 50,567,589	\$ 6,949,298,910
Plan B - Straight Life / Straight Life Plan	91,229	210,762,650	26,281,145,359
Plan C - Special Joint & Survivor*	33,729	97,315,333	14,760,251,659
Plan D - Joint & 100%	19,673	56,061,824	9,008,477,442
Plan E - Life & 0 to 5 Years Guaranteed	270	625,797	76,442,711
- Life & 6 to 10 Years Guaranteed	401	883,479	107,119,535
- Life & 11 to 15 Years Guaranteed	578	1,106,366	136,310,568
- Life & 16 to 20 Years Guaranteed	61	162,973	24,059,854
Plan F - Multiple Continuing Beneficiaries (Includes Multiple Life Plan)	1,339	3,748,195	717,180,468
Reserve for Combined Plan Future Adverse Experience			627,570
Reserve for Member Directed Future Adverse Experience			2,759,151
Money Purchase	4,176	1,849,762	189,152,667
Survivor Beneficiary - Life Benefit	17,781	24,960,533	2,521,986,460
Survivor Beneficiary - Temporary Benefit	62	107,223	5,086,122
<b>Total Superannuation</b>	<b>186,568</b>	<b>\$ 448,151,724</b>	<b>\$ 60,779,898,476</b>
<b>Disability Retirement</b>	<b>20,264</b>	<b>\$ 53,364,792</b>	<b>\$ 7,278,246,724</b>
<b>Total from A &amp; PR</b>	<b>206,832</b>	<b>\$ 501,516,516</b>	<b>\$ 68,058,145,200</b>

\* Includes post September 1, 2013 retirements that elected the Joint Life Plan.

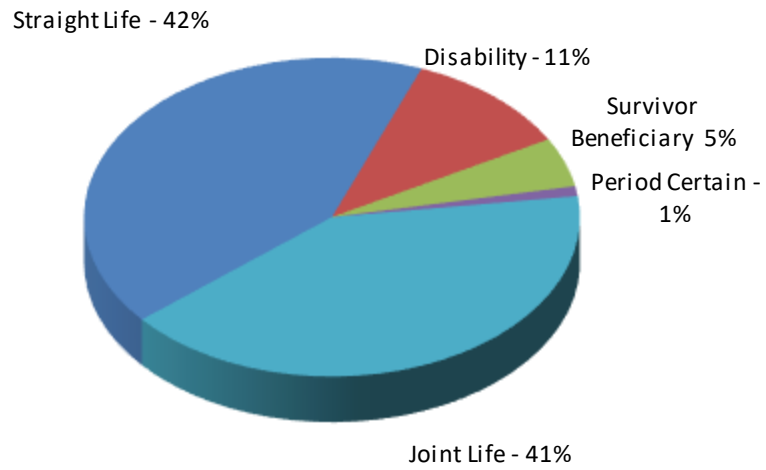
**Annuity and Pension Reserve Fund**  
**Retirees and Beneficiaries December 31, 2019**  
**Type of Benefit and Amount by Gender of Recipient**

Type of Allowance	Men		Women		Total	
	Number	Monthly Allowances	Number	Monthly Allowances	Number	Monthly Allowances
Superannuation Retirement						
Plan A - Joint & 50%	11,171	\$ 35,025,292	6,098	\$ 15,542,297	17,269	\$ 50,567,589
Plan B - Straight Life / Straight Life Plan	28,262	73,506,753	62,967	137,255,897	91,229	210,762,650
Plan C - Special Joint & Survivor*	18,632	58,469,809	15,097	38,845,524	33,729	97,315,333
Plan D - Joint & 100%	15,542	46,416,471	4,131	9,645,353	19,673	56,061,824
Plan E - Life & 0 to 5 Years Guaranteed	111	284,343	159	341,454	270	625,797
- Life & 6 to 10 Years Guaranteed	194	428,973	207	454,506	401	883,479
- Life & 11 to 15 Years Guaranteed	309	578,634	269	527,732	578	1,106,366
- Life & 16 to 20 Years Guaranteed	41	99,581	20	63,392	61	162,973
Plan F - Multiple Continuing Beneficiaries (Includes Multiple Life Plan)	516	1,699,934	823	2,048,261	1,339	3,748,195
Money Purchase	2,565	1,371,919	1,611	477,843	4,176	1,849,762
Survivor Beneficiary - Life Benefit	2,484	2,208,077	15,297	22,752,456	17,781	24,960,533
Survivor Beneficiary - Temporary Benefit	18	39,533	44	67,690	62	107,223
Total Superannuation	79,845	\$ 220,129,319	106,723	\$ 228,022,405	186,568	\$ 448,151,724
Disability Retirement	10,399	\$ 29,805,330	9,865	\$ 23,559,462	20,264	\$ 53,364,792
<b>Total from A &amp; PR</b>	<b>90,244</b>	<b>\$ 249,934,649</b>	<b>116,588</b>	<b>\$ 251,581,867</b>	<b>206,832</b>	<b>\$ 501,516,516</b>

\* Includes post September 1, 2013 retirements that elected the Joint Life Plan.

# Annuities Being Paid by Type December 31, 2019

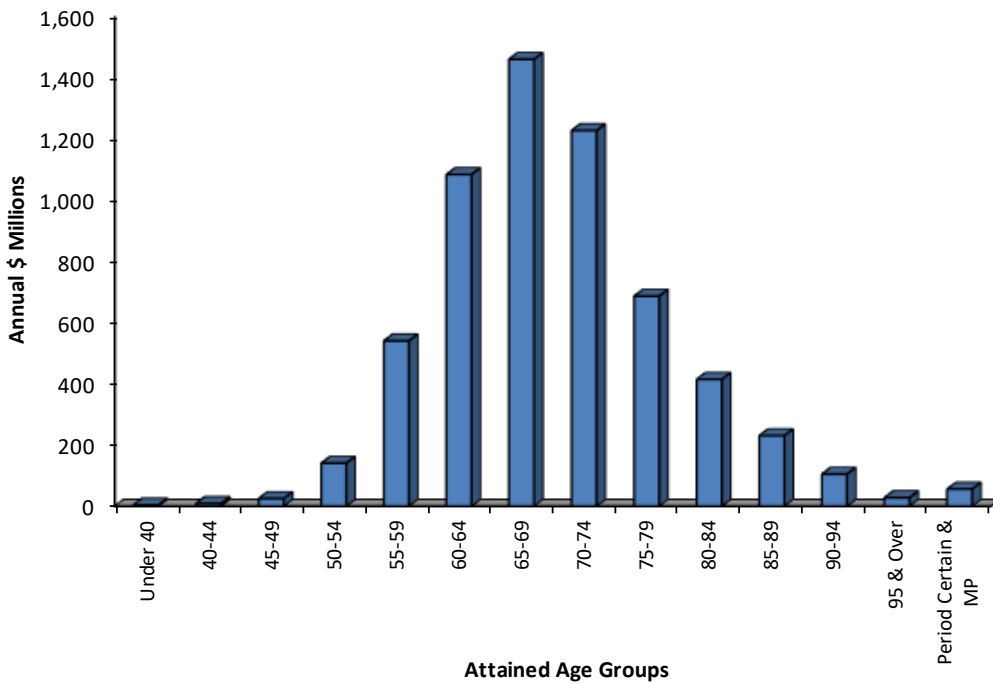
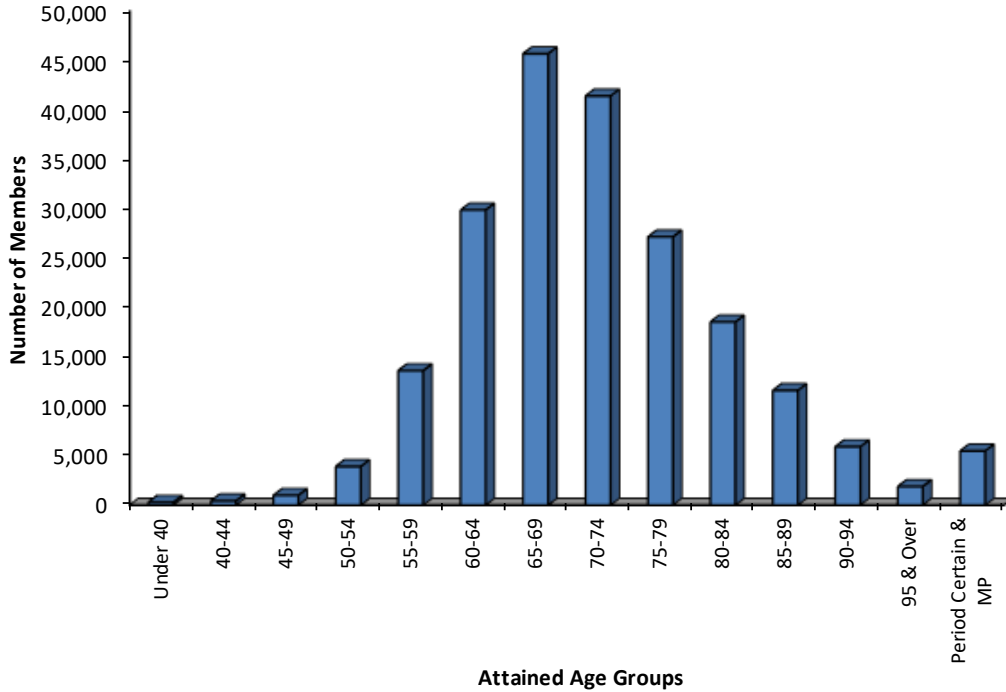
## Annuity and Pension Reserve Fund



**Annuity and Pension Reserve Fund  
Retirees and Beneficiaries December 31, 2019  
Current Monthly Total \$ by Attained Ages**

Attained Ages	Superannuation		Disability		Totals	
	No.	Monthly Total	No.	Monthly Total	No.	Monthly Total
Under 20	14	\$ 13,279			14	\$ 13,279
20-24	22	19,131			22	19,131
25-29	44	32,501	1	\$ 1,461	45	33,962
30-34	47	40,290	16	28,214	63	68,504
35-39	54	51,507	94	165,907	148	217,414
40-44	77	59,278	356	710,202	433	769,480
45-49	132	150,055	864	1,930,792	996	2,080,847
50-54	1,997	6,574,449	1,916	5,210,470	3,913	11,784,919
55-59	9,931	34,577,773	3,686	10,490,583	13,617	45,068,356
60-64	24,758	76,386,644	5,122	14,034,276	29,880	90,420,920
65-69	42,154	111,748,498	3,536	10,073,129	45,690	121,821,627
70-74	38,885	95,929,694	2,531	6,508,717	41,416	102,438,411
75-79	25,900	54,515,560	1,258	2,698,368	27,158	57,213,928
80-84	17,974	33,533,853	567	1,080,239	18,541	34,614,092
85-89	11,395	18,924,809	215	301,301	11,610	19,226,110
90-94	5,826	8,658,609	91	117,172	5,917	8,775,781
95 & Over	1,872	2,307,417	11	13,961	1,883	2,321,378
Period Certain & Money Purchase	5,486	4,628,377			5,486	4,628,377
<b>Totals</b>	<b>186,568</b>	<b>\$448,151,724</b>	<b>20,264</b>	<b>\$53,364,792</b>	<b>206,832</b>	<b>\$501,516,516</b>

# Annuity and Pension Reserve Fund Benefits Being Paid by Attained Ages December 31, 2019



## Annuity and Pension Reserve Fund Percent of Recipients by Age Groups and Year

Attained Age Group	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Under 30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
30-39	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.4%	0.5%	0.5%
40-49	0.7%	0.8%	0.9%	1.1%	1.1%	1.3%	1.5%	1.8%	2.0%	2.2%	2.5%	2.7%	2.9%	3.1%	3.3%
50-59	8.5%	9.5%	10.6%	11.5%	12.5%	13.7%	14.6%	15.4%	15.9%	15.9%	16.0%	15.9%	15.9%	16.1%	15.8%
60-69	36.4%	37.3%	37.9%	38.6%	38.8%	37.9%	36.5%	35.5%	34.8%	33.5%	32.6%	31.4%	30.7%	29.6%	28.9%
70-79	33.2%	31.4%	29.8%	27.9%	26.7%	26.2%	26.1%	25.8%	25.4%	25.7%	26.2%	26.7%	27.2%	27.7%	28.5%
80-89	14.6%	14.5%	14.3%	14.4%	14.4%	14.4%	14.8%	15.3%	15.8%	16.6%	16.9%	17.4%	17.7%	17.9%	18.0%
90 & Over	3.8%	3.7%	3.7%	3.7%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.4%	3.4%	3.3%	3.2%	3.2%
Period Certain & MP	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.4%	2.3%	2.2%	2.1%	2.1%	1.9%	1.9%	1.8%
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
Average Age	71.2	70.9	70.9	70.6	70.4	70.2	70.0	69.9	69.9	70.0	70.0	70.1	70.1	70.2	70.2

**STATE DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	211	\$ 273,471	\$ 30,108,522
Women	608	1,058,015	122,368,986
<b>Totals</b>	<b>819</b>	<b>\$ 1,331,486</b>	<b>\$ 152,477,508</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	755	\$ 1,021,573	\$ 130,943,481
Parent	0	0	0
Other	2	1,439	271,531
Child	281	244,175	15,236,846
<b>Subtotals - Male</b>	<b>1,038</b>	<b>\$ 1,267,187</b>	<b>\$ 146,451,858</b>
<b>Females</b>			
Widow	2,134	\$ 3,158,569	\$ 427,520,394
Parent	0	0	0
Other	4	4,465	546,654
Child	289	250,728	14,095,881
<b>Subtotals - Female</b>	<b>2,427</b>	<b>\$ 3,413,762</b>	<b>\$ 442,162,929</b>
<b>Totals</b>	<b>3,465</b>	<b>\$ 4,680,949</b>	<b>\$ 588,614,787</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	1,249	\$ 1,540,658	\$ 176,560,380
Women	3,035	4,471,777	564,531,915
<b>Totals</b>	<b>4,284</b>	<b>\$ 6,012,435</b>	<b>\$ 741,092,295</b>

**LOCAL GOVERNMENT DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	316	\$ 334,608	\$ 35,801,018
Women	1,270	1,691,149	190,812,954
<b>Totals</b>	<b>1,586</b>	<b>\$ 2,025,757</b>	<b>\$ 226,613,972</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	1,242	\$ 1,240,955	\$ 156,798,886
Parent	0	0	0
Other	0	0	0
Child	590	414,162	27,503,470
<b>Subtotals - Male</b>	<b>1,832</b>	<b>\$ 1,655,117</b>	<b>\$ 184,302,356</b>
<b>Females</b>			
Widow	5,137	\$ 5,790,582	\$ 762,557,061
Parent	0	0	0
Other	11	10,470	1,031,749
Child	543	391,315	23,542,205
<b>Subtotals - Female</b>	<b>5,691</b>	<b>\$ 6,192,367</b>	<b>\$ 787,131,015</b>
<b>Totals</b>	<b>7,523</b>	<b>\$ 7,847,484</b>	<b>\$ 971,433,371</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	2,148	\$ 1,989,725	\$ 220,103,374
Women	6,961	7,883,516	977,943,969
<b>Totals</b>	<b>9,109</b>	<b>\$ 9,873,241</b>	<b>\$ 1,198,047,343</b>



**PUBLIC SAFETY DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation</b>			
Men	2	\$ 2,639	\$ 339,630
Women	16	27,454	3,753,495
<b>Totals</b>	<b>18</b>	<b>\$ 30,093</b>	<b>\$ 4,093,125</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount</b>			
<b>Males</b>			
Widower	3	\$ 4,050	\$ 321,045
Other	0	0	0
Child	2	1,446	21,672
<b>Subtotals - Male</b>	<b>5</b>	<b>\$ 5,496</b>	<b>\$ 342,717</b>
<b>Females</b>			
Widow	89	\$ 139,359	\$ 19,892,642
Other	0	0	0
Child	4	3,551	500,234
<b>Subtotals - Female</b>	<b>93</b>	<b>\$ 142,910</b>	<b>\$ 20,392,876</b>
<b>Totals</b>	<b>98</b>	<b>\$ 148,406</b>	<b>\$ 20,735,593</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	7	\$ 8,135	\$ 682,347
Women	109	170,364	24,146,371
<b>Totals</b>	<b>116</b>	<b>\$ 178,499</b>	<b>\$ 24,828,718</b>

**LAW ENFORCEMENT DIVISION**  
**Survivor Benefit Fund Tabulated by**  
**Type of Benefit Being Paid and Monthly Amount**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
<b>S-1 - Survivor Benefit to Beneficiary of Deceased Member</b>			
<b>Joint and Survivor Computation</b>			
Men	1	\$ 1,409	\$ 169,181
Women	52	106,962	12,554,845
<b>Totals</b>	<b>53</b>	<b>\$ 108,371</b>	<b>\$ 12,724,026</b>
<b>S-2 - Survivor Benefit to Beneficiary of Deceased Member</b>			
<b>Fixed Rate Amount</b>			
<b>Males</b>			
Widower	15	\$ 15,945	\$ 2,293,625
Other	0	0	0
Child	69	56,521	2,931,871
<b>Subtotals - Male</b>	<b>84</b>	<b>\$ 72,466</b>	<b>\$ 5,225,496</b>
<b>Females</b>			
Widow	224	\$ 309,644	\$ 49,219,311
Other	0	0	0
Child	66	52,173	2,593,419
<b>Subtotals - Female</b>	<b>290</b>	<b>\$ 361,817</b>	<b>\$ 51,812,730</b>
<b>Totals</b>	<b>374</b>	<b>\$ 434,283</b>	<b>\$ 57,038,226</b>
<b>Total Benefits Being Paid from Survivor Benefit Fund</b>			
Men	85	\$ 73,875	\$ 5,394,677
Women	342	468,779	64,367,575
<b>Totals</b>	<b>427</b>	<b>\$ 542,654</b>	<b>\$ 69,762,252</b>

**STATE DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Male			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	53	62,310	5,912,525
Deferred to age 65	0	0	0
<b>Total - Male</b>	<b>53</b>	<b>\$ 62,310</b>	<b>\$ 5,912,525</b>
Widows - Female			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	156	129,999	14,858,601
Deferred to age 65	0	0	0
<b>Total - Female</b>	<b>156</b>	<b>\$ 129,999</b>	<b>\$ 14,858,601</b>
<b>Totals</b>	<b>209</b>	<b>\$ 192,309</b>	<b>\$ 20,771,126</b>

**LOCAL GOVERNMENT DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
<b>Widowers - Males</b>			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	114	78,687	9,019,673
Deferred to age 65	0	0	0
<b>Total - Male</b>	<b>114</b>	<b>\$ 78,687</b>	<b>\$ 9,019,673</b>
<b>Widows - Female</b>			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	326	221,241	27,021,870
Deferred to age 65	0	0	0
<b>Total - Female</b>	<b>326</b>	<b>\$ 221,241</b>	<b>\$ 27,021,870</b>
<b>Totals</b>	<b>440</b>	<b>\$ 299,928</b>	<b>\$ 36,041,543</b>

**PUBLIC SAFETY DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Total - Male	0	\$ 0	\$ 0
Widows - Females			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	5	2,587	283,342
Total - Female	5	\$ 2,587	\$ 283,342
<b>Totals</b>	<b>5</b>	<b>\$ 2,587</b>	<b>\$ 283,342</b>

**LAW ENFORCEMENT DIVISION**  
**Deferred Survivor Beneficiaries**  
**Tabulated by Gender and Deferred Age**  
**December 31, 2019**

Group	Number	Current Total	Actuarial Liabilities
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	0	0	0
Total - Male	0	\$ 0	\$ 0
Widows - Females			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	2	1,648	170,208
Total - Female	2	\$ 1,648	\$ 170,208
<b>Totals</b>	<b>2</b>	<b>\$ 1,648</b>	<b>\$ 170,208</b>

## Survivor Benefit Fund Reported Assets and Liabilities Divisions Combined

Valuation Date	Monthly Allowances				\$ Millions		Ratio of Assets to Liabilities
	Current		Deferred		Reported Assets+	Actuarial Liabilities	
	No.	Amount	No.	Amount			
12/31/1985	11,889	\$ 3,278,253	979	\$ 259,842	\$ 532.8	\$ 469.6	113 %
12/31/1986	12,054	3,489,915	960	268,931	575.5	451.2	128 %
12/31/1987	12,153	3,656,420	933	279,327	626.1	472.9	132 %
12/31/1988	12,237	3,822,085	941	283,026	490.8	490.8	100 %
12/31/1989@	12,198	4,177,540	941	320,792	525.3	522.1	101 %
12/31/1990	12,182	4,330,622	907	321,218	542.5	537.1	101 %
12/31/1991	12,268	4,528,326	860	314,414	567.9	557.1	102 %
12/31/1992	12,318	4,750,848	852	329,509	589.8	583.3	101 %
12/31/1993	12,437	4,985,681	862	345,937	620.7	607.7	102 %
12/31/1994	12,569	5,207,186	845	347,178	641.5	628.5	102 %
12/31/1995	12,608	5,408,577	866	376,573	668.9	652.4	103 %
12/31/1996@	12,724	5,822,113	878	395,594	711.6	710.6	100 %
12/31/1997	12,856	6,074,566	932	433,430	743.0	740.5	100 %
12/13/1998	13,079	6,337,739	1,060	500,514	780.2	779.6	100 %
12/31/1999#	13,236	7,345,740	989	550,153	801.4	910.9	88 %
12/31/2000	13,317	9,026,315	666	348,886	1,037.4	1,037.4	100 %
12/31/2001@	13,588	9,449,543	993	490,441	1,086.4	1,086.4	100 %
12/31/2002	13,708	9,764,826	902	470,284	1,120.2	1,120.2	100 %
12/31/2003	13,988	10,246,174	842	493,329	1,193.1	1,193.1	100 %
12/31/2004	13,903	10,503,169	858	524,733	1,227.1	1,227.1	100 %
12/31/2005@	14,108	10,948,727	831	528,162	1,289.3	1,289.3	100 %
12/31/2006	14,172	11,333,735	832	508,430	1,332.6	1,332.6	100 %
12/31/2007	14,186	11,714,551	832	510,846	1,375.9	1,375.9	100 %
12/31/2008	14,238	12,122,501	847	526,623	1,425.6	1,425.6	100 %
12/31/2009	14,301	12,576,956	840	527,032	1,479.4	1,479.4	100 %
12/31/2010@	14,407	13,047,857	829	524,242	1,545.7	1,545.7	100 %
12/31/2011	14,370	13,424,237	800	505,111	1,589.7	1,589.7	100 %
12/31/2012#	14,224	13,769,795	796	519,459	1,629.3	1,629.3	100 %
12/31/2013	14,187	14,152,417	751	480,335	1,663.5	1,663.5	100 %
12/31/2014	13,974	14,406,311	739	474,837	1,688.7	1,688.7	100 %
12/31/2015@	13,842	14,728,606	750	479,666	1,838.1	1,838.1	100 %
12/31/2016	13,790	15,119,687	715	462,896	1,881.1	1,881.1	100 %
12/31/2017	13,960	15,655,980	726	553,126	1,942.9	1,942.9	100 %
12/31/2018	13,890	16,063,379	706	542,369	2,034.1	2,034.1	100 %
12/31/2019	13,936	16,606,829	656	496,472	2,091.0	2,091.0	100 %

@ Revised actuarial assumptions.

# After benefit changes.

+ Includes certain recommended transfers and accrued transfers.



# Retirees and Beneficiaries December 31, 2019

## Historical Averages

All Retirees								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2019	221,424	57.9	23.2	\$21,881	71.1	\$28,740	\$25,140	\$44,379
2018	219,075	57.8	23.1	21,429	70.7	27,944	24,408	43,395
2017	216,978	57.7	23.0	20,993	70.4	27,161	23,652	42,486
2016	214,167	57.6	22.9	20,526	70.2	26,370	22,848	41,524
2015	211,301	57.6	22.8	20,076	69.9	25,579	22,056	40,604
2014	208,809	57.6	22.8	19,673	69.7	24,833	21,348	39,753
2013	202,136	57.4	22.8	19,290	69.5	24,209	20,784	38,763
2012	195,779	57.4	22.7	18,827	69.3	23,461	20,088	37,743
2011	189,849	57.3	22.6	18,218	69.3	22,611	19,212	36,552
2010	181,483	57.2	22.4	17,379	69.3	21,598	18,144	35,025
2009	174,659	57.2	22.2	16,724	69.3	20,730	17,256	33,808
2008	169,016	57.2	22.0	15,942	69.4	19,750	16,284	32,401
2007	163,511	57.2	21.9	15,318	69.4	18,917	15,480	31,214
2006	159,041	57.3	21.7	14,711	69.4	18,096	14,700	29,975
Traditional Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2019	220,448	57.9	23.3	\$21,912	71.1	\$28,784	\$25,188	\$44,368
2018	218,226	57.8	23.2	21,456	70.7	27,981	24,444	43,386
2017	216,260	57.7	23.1	21,016	70.4	27,192	23,688	42,479
2016	213,550	57.6	23.0	20,545	70.2	26,396	22,884	41,519
2015	210,792	57.6	22.9	20,092	69.9	25,600	22,080	40,600
2014	208,395	57.6	22.8	19,686	69.7	24,849	21,372	39,749
2013	201,841	57.4	22.8	19,299	69.5	24,220	20,796	38,760
2012	195,622	57.4	22.7	18,832	69.3	23,468	20,088	37,741
2011	189,753	57.3	22.6	18,221	69.3	22,614	19,224	36,549
2010	181,433	57.2	22.4	17,380	69.3	21,600	18,144	35,025
2009	174,637	57.2	22.2	16,725	69.3	20,731	17,256	33,808
2008	169,000	57.2	22.0	15,942	69.4	19,751	16,284	32,401
2007	163,505	57.2	21.9	15,318	69.4	18,917	15,480	31,214
2006	159,039	57.3	21.7	14,711	69.4	18,096	14,700	29,974
Combined Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2019	659	64.8	11.1	\$4,686	69.1	\$5,107	\$4,314	\$50,618
2018	569	64.8	10.6	4,338	68.7	4,697	4,020	49,007
2017	476	64.7	10.3	4,000	68.2	4,304	3,816	47,455
2016	398	64.8	10.0	3,709	67.9	3,956	3,528	46,614
2015	324	64.6	9.8	3,401	67.3	3,596	3,186	45,141
2014	259	64.7	9.7	3,284	66.8	3,421	3,030	44,349
2013	164	64.9	8.7	2,839	67.0	2,962	2,682	43,403
2012	95	64.2	8.5	2,785	66.2	2,891	2,556	45,218
2011	58	64.2	7.9	2,757	66.0	2,828	2,202	49,751
2010	32	64.3	7.9	2,158	65.9	2,219	1,962	40,548
2009	12	65.0	7.6	1,590	66.6	1,635	1,740	35,139
2008	12	64.0	7.4	1,239	64.8	1,260	1,092	29,454
2007	4	61.1	4.8	1,620	62.0	1,644	1,644	43,743
2006	2	62.1	3.8	1,656	62.3	1,656	1,656	50,116
DB Portion of Member Directed Plan								
December 31	Number Count	Average Age at Retirement	Average Service at Retirement	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date	Median Pension on Valuation Date	Average FAS at Retirement
2019	317	NA	NA	NA	NA	NA	NA	NA
2018	280	NA	NA	NA	NA	NA	NA	NA
2017	242	NA	NA	NA	NA	NA	NA	NA
2016	219	NA	NA	NA	NA	NA	NA	NA
2015	185	NA	NA	NA	NA	NA	NA	NA
2014	155	NA	NA	NA	NA	NA	NA	NA
2013	131	NA	NA	NA	NA	NA	NA	NA
2012	62	NA	NA	NA	NA	NA	NA	NA
2011	38	NA	NA	NA	NA	NA	NA	NA
2010	18	NA	NA	NA	NA	NA	NA	NA
2009	10	NA	NA	NA	NA	NA	NA	NA
2008	4	NA	NA	NA	NA	NA	NA	NA
2007	2	NA	NA	NA	NA	NA	NA	NA
2006	NA	NA	NA	NA	NA	NA	NA	NA



## SECTION X

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### ACTUARIAL METHODS AND ASSUMPTIONS

# Summary of Actuarial Methods and Assumptions used for OPERS Actuarial Valuations Assumptions Adopted by the Retirement Board After Consulting with the Actuary

**The individual entry age actuarial cost method of valuation** was used in determining liabilities and normal cost. Differences in the past between assumed experience and actual experience (“actuarial gains and losses”) become part of actuarial accrued liabilities.

Unfunded actuarial accrued liabilities are amortized to produce payments (principal & interest) which are level percent of payroll contributions.

**The actuarial assumptions used** in the valuation are shown in this Section. Assumptions were established following the December 31, 2015 actuarial valuation based upon an Experience Study covering the period January 1, 2011 through December 31, 2015 and updated in conjunction with an Investment Return Assumption review performed in between the December 31, 2017 and December 31, 2018 Actuarial Valuations. The actuarial assumptions represent estimates of future experience.

## ECONOMIC ASSUMPTIONS

**The investment return rate** assumed in the valuations was 7.20% per year, compounded annually (net after investment expenses).

**The wage inflation rate** assumed in this valuation was 3.25% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes related to individual merit and seniority effects.

**The price inflation** component of the investment return rate and the wage inflation rate is assumed to be 2.50%.

**The assumed real rate of return** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 7.20% investment return rate translates to an assumed real rate of return over wage inflation of 3.95%. The assumed real rate of return over price inflation is 4.70%.

**The active member population** (the sum of the Traditional and Combined Plan active members) is assumed to remain constant. For purposes of financing the unfunded actuarial accrued liabilities, total payroll (the sum of the Traditional and Combined Plan active payroll) is assumed to grow at the wage inflation rate – 3.25% per year.

**Pay increase assumptions** for individual active members are shown for sample ages on pages X-8 through X-11. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.25% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.



## Non-Economic Assumptions

**The pre-retirement mortality tables**, for pre-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The healthy retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The disabled retiree mortality tables**, for post-retirement mortality, used in evaluating allowances to be paid were the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010 respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to the above described tables.

**The probabilities of unreduced and reduced age and service retirement** are shown on pages X-3 through X-7. For State and Local Government members that satisfy the 30-year (31 & 32 years for Transition Groups B & C) unreduced retirement condition prior to age 65 (66 & 67 for Transition Groups B & C), the service-based unreduced retirement probabilities are used. For State and Local Government members that satisfy the 30-year (31 & 32 years for Transition Groups B & C) unreduced retirement condition on or after age 65 (66 & 67 for Transition Groups B & C), the age-based unreduced retirement probabilities are used.

**The probabilities of withdrawal from service, disability and death-in-service** are shown for sample ages on pages X-8 through X-11. For withdrawal from service it was assumed that members terminating before age 35, members terminating with less than 5 years of service, and a percentage of all other members would withdraw their contributions and forfeit their entitlement to an employer financed benefit. The percentage is 100% at age 35 and is reduced for each year of age after 35, becoming 0% at age 55 (age 45 for law members).

**For purposes of death-in-service and disability benefits**, it is assumed that Combined Plan members will take a benefit from the Traditional Plan, unless a lump sum distribution from the Combined Plan would have a greater value. It is assumed death-in-service members have 2 qualified survivor beneficiaries.

**The funding value of defined benefit assets** recognizes assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over a closed 4-year period. Funding value is not permitted to deviate from market value by more than 12%. Traditional and Combined Plan retiree health funding values of assets are developed independently beginning with the December 31, 2004 valuation.

**Present assets (cash & investments) at funding value** are shown on pages II-2 through II-9.

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The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA). Great care was taken in the production of this report, but there may be cases where schedules do not add, or where they do not exactly balance to other related schedules due to rounding.

# Probabilities of Unreduced Age and Service Retirement

## Transition Group A

Ages	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
65	22%	22%	20%	20%
66	22%	22%	20%	20%
67	20%	20%	15%	20%
68	20%	20%	15%	17%
69	20%	20%	15%	17%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	15%	20%	15%	17%
73	15%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	25%	15%	17%
78	15%	25%	15%	17%
79	15%	25%	15%	22%
80	25%	25%	20%	22%
81	25%	25%	20%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
	48	
49		20%
50		20%
51		20%
52	30%	20%
53	30%	20%
54	25%	20%
55	25%	20%
56	25%	23%
57	25%	23%
58	20%	25%
59	20%	25%
60	35%	30%
61	35%	25%
62	35%	25%
63	35%	25%
64	35%	25%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70 & Over	100%	100%
Ref	1334	2084

Service	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
30	37%	40%	35%	35%
31	28%	33%	26%	30%
32-39	24%	26%	23%	24%
40	35%	33%	32%	24%
41	35%	33%	32%	24%
42	35%	33%	32%	24%
43	35%	33%	32%	20%
44	35%	33%	32%	20%
45	25%	25%	32%	20%
46	25%	25%	25%	20%
47	25%	25%	25%	20%
48	25%	25%	25%	20%
49	25%	25%	25%	20%
50 & Over	100%	100%	100%	100%
Ref	2091	2093	2098	2099

# Probabilities of Unreduced Age and Service Retirement

## Transition Group B

Ages	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
66	22%	22%	20%	20%
67	22%	22%	20%	20%
68	20%	20%	15%	20%
69	20%	20%	15%	17%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	20%	20%	15%	17%
73	15%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	20%	15%	17%
78	15%	25%	15%	17%
79	15%	25%	15%	17%
80	15%	25%	15%	22%
81	25%	25%	20%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
	50	
51		20%
52		20%
53		20%
54	25%	20%
55	25%	20%
56	25%	20%
57	25%	20%
58	20%	23%
59	20%	23%
60	35%	25%
61	35%	25%
62	35%	30%
63	35%	25%
64	35%	25%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70	100%	25%
71	100%	25%
72 & Over	100%	100%
Ref	1334	2084

Service	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
31	37%	40%	35%	35%
32	28%	33%	26%	30%
33-40	24%	26%	23%	24%
41	35%	33%	32%	24%
42	35%	33%	32%	24%
43	35%	33%	32%	24%
44	35%	33%	32%	20%
45	35%	33%	32%	20%
46	25%	25%	32%	20%
47	25%	25%	25%	20%
48	25%	25%	25%	20%
49	25%	25%	25%	20%
50	25%	25%	25%	20%
51 & Over	100%	100%	100%	100%
Ref	2091	2093	2098	2099

# Probabilities of Unreduced Age and Service Retirement

## Transition Group C

67 & 5 Condition	Percent of Eligible Active Members Retiring Within Next Year			
	State		Local Government	
	Men	Women	Men	Women
Age				
67	22%	22%	20%	20%
68	22%	22%	20%	20%
69	20%	20%	15%	20%
70	20%	20%	15%	17%
71	20%	20%	15%	17%
72	20%	20%	15%	17%
73	20%	20%	15%	17%
74	15%	20%	15%	17%
75	15%	20%	15%	17%
76	15%	20%	15%	17%
77	15%	20%	15%	17%
78	15%	20%	15%	17%
79	15%	25%	15%	17%
80	15%	25%	15%	17%
81	15%	25%	15%	22%
82	25%	25%	20%	22%
83	25%	25%	20%	22%
84	25%	25%	20%	22%
85 & Over	100%	100%	100%	100%
Ref	2094	2095	2096	2097

Ages	Percent of Eligible Active Members Retiring Within Next Year	
	Public Safety	Law Enforcement
	52	
53		20%
54		20%
55		20%
56	25%	20%
57	25%	20%
58	20%	20%
59	20%	20%
60	35%	23%
61	35%	23%
62	35%	25%
63	35%	25%
64	35%	30%
65	35%	25%
66	35%	25%
67	35%	25%
68	35%	25%
69	35%	25%
70	100%	25%
71	100%	25%
72	100%	25%
73	100%	25%
74 & Over	100%	100%
Ref	1334	2084

55 & 32 Condition	Percent of Eligible Active Members Retiring Within Next Year				
	Year of Eligibility	State		Local Government	
		Men	Women	Men	Women
1	37%	40%	35%	35%	
2	28%	33%	26%	30%	
3-10	24%	26%	23%	24%	
11	35%	33%	32%	24%	
12	35%	33%	32%	24%	
13	35%	33%	32%	24%	
14	35%	33%	32%	20%	
15	35%	33%	32%	20%	
16	25%	25%	32%	20%	
17	25%	25%	25%	20%	
18	25%	25%	25%	20%	
19	25%	25%	25%	20%	
20	25%	25%	25%	20%	
21 & over	100%	100%	100%	100%	
Ref	2091	2093	2098	2099	

# Probabilities of Reduced Retirement

## Transition Group A

Ages	Percent of Eligible Active Members Retiring Within Next Year				
	State		Local Government		Public Safety
	Men	Women	Men	Women	
48					8%
49					8%
50					8%
51					8%
52					
53					
54					
55	10%	10%	9%	11%	
56	10%	10%	9%	11%	
57	10%	10%	9%	11%	
58	10%	10%	9%	11%	
59	10%	11%	9%	11%	
60	10%	12%	9%	11%	
61	10%	13%	9%	12%	
62	15%	15%	13%	13%	
63	15%	15%	14%	14%	
64	15%	15%	12%	15%	
Ref	2085	2086	2087	2088	1496

## Transition Group B

Ages	Percent of Eligible Active Members Retiring Within Next Year					
	State		Local Government		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48					8%	8%
49					8%	8%
50					8%	
51					8%	
52					8%	
53					8%	
54						
55	10%	10%	9%	11%		
56	10%	10%	9%	11%		
57	10%	10%	9%	11%		
58	10%	10%	9%	11%		
59	10%	11%	9%	11%		
60	10%	12%	9%	11%		
61	10%	13%	9%	12%		
62	15%	15%	13%	13%		
63	15%	15%	14%	14%		
64	15%	15%	12%	15%		
65	15%	15%	12%	15%		
Ref	2085	2086	2087	2088	469	1496

# Probabilities of Reduced Retirement

## Transition Group C

Ages	Percent of Eligible Active Members Retiring Within Next Year					
	State		Local Government		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48						8%
49						8%
50						8%
51						8%
52					8%	
53					8%	
54					8%	
55					8%	
56						
57	10%	10%	9%	11%		
58	10%	10%	9%	11%		
59	10%	10%	9%	11%		
60	10%	10%	9%	11%		
61	10%	11%	9%	11%		
62	10%	12%	9%	11%		
63	10%	13%	9%	12%		
64	15%	15%	13%	13%		
65	15%	15%	14%	14%		
66	15%	15%	12%	15%		
Ref	2085	2086	2087	2088	1496	1496



## STATE

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			50.00%	50.00%					
	1			35.00%	35.00%					
	2			20.00%	20.00%					
	3			15.00%	15.00%					
	4			12.00%	12.00%					
20	5 & Over	0.0439%	0.0146%	10.00%	10.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0481%	0.0153%	8.20%	9.28%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0426%	0.0203%	5.80%	7.30%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0517%	0.0305%	4.28%	5.10%	0.16%	0.16%	2.40%	3.25%	5.65%
40		0.0689%	0.0425%	3.14%	3.46%	0.29%	0.29%	1.90%	3.25%	5.15%
45		0.1088%	0.0628%	2.22%	2.42%	0.47%	0.47%	1.34%	3.25%	4.59%
50		0.1781%	0.1014%	1.84%	2.10%	0.67%	0.67%	0.92%	3.25%	4.17%
55		0.2787%	0.1688%	1.80%	2.10%	1.05%	1.05%	0.68%	3.25%	3.93%
60		0.4798%	0.2616%	1.80%	2.10%	1.25%	1.25%	0.42%	3.25%	3.67%
65		0.9161%	0.3883%	1.80%	2.10%	1.25%	1.25%	0.12%	3.25%	3.37%
70		1.5905%	0.6522%	1.80%	2.10%	1.25%	1.25%	0.00%	3.25%	3.25%
Ref		#2133x1sb0	#2134x1sb0	1034 #1387x1	1034 #1389x1	#1092x1	#1092x1	476		

\*Applicable rates during the 2019 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## LOCAL GOVERNMENT

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			40.00%	40.00%					
	1			27.00%	27.00%					
	2			18.00%	18.00%					
	3			13.00%	13.00%					
	4			11.00%	11.00%					
20	5 & Over	0.0439%	0.0146%	10.00%	11.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0481%	0.0153%	7.78%	9.32%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0426%	0.0203%	5.34%	6.94%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0517%	0.0305%	3.86%	5.02%	0.13%	0.10%	2.34%	3.25%	5.59%
40		0.0689%	0.0425%	2.82%	3.52%	0.21%	0.16%	1.77%	3.25%	5.02%
45		0.1088%	0.0628%	2.26%	2.70%	0.37%	0.26%	1.28%	3.25%	4.53%
50		0.1781%	0.1014%	2.04%	2.50%	0.63%	0.42%	0.92%	3.25%	4.17%
55		0.2787%	0.1688%	2.00%	2.50%	0.90%	0.71%	0.68%	3.25%	3.93%
60	0.4798%	0.2616%	2.00%	2.50%	1.00%	0.85%	0.42%	3.25%	3.67%	
65	0.9161%	0.3883%	2.00%	2.50%	1.00%	0.85%	0.12%	3.25%	3.37%	
70	1.5905%	0.6522%	2.00%	2.50%	1.00%	0.85%	0.00%	3.25%	3.25%	
Ref		#2133x1sb0	#2134x1sb0	1035 #1391x1	1035 #1393x1	#1093x1	#1094x1	477		

\*Applicable rates during the 2019 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## PUBLIC SAFETY

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			20.00%	20.00%					
	1			19.00%	19.00%					
	2			15.00%	15.00%					
	3			15.00%	15.00%					
	4			10.00%	10.00%					
20	5 & Over	0.0439%	0.0146%	10.00%	10.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0481%	0.0153%	10.00%	10.00%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0426%	0.0203%	8.80%	8.80%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0517%	0.0305%	6.20%	6.20%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0689%	0.0425%	3.50%	3.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1088%	0.0628%	2.20%	2.20%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1781%	0.1014%	2.00%	2.00%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2787%	0.1688%	2.00%	2.00%	2.32%	2.65%	0.60%	3.25%	3.85%
60		0.4798%	0.2616%	2.00%	2.00%	2.60%	2.75%	0.40%	3.25%	3.65%
65		0.9161%	0.3883%	2.00%	2.00%	2.60%	2.75%	0.16%	3.25%	3.41%
70		1.5905%	0.6522%	2.00%	2.00%	2.60%	2.75%	0.00%	3.25%	3.25%
Ref		#2133x1sb0	#2134x1sb0	1036 #1211x1	1036 #1211x1	#1095x1	#1096x1	485		

\*Applicable rates during the 2019 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## LAW ENFORCEMENT

### Separations from Active Employment Before Age & Service Retirement & Individual Pay Increase Assumptions

Sample Ages	Years of Service	Percent of Active Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Employee		
		Death*		Withdrawal		Disability		Merit & Seniority	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0			16.00%	20.00%					
	1			10.00%	12.00%					
	2			8.00%	9.00%					
	3			6.00%	6.00%					
	4			5.00%	6.00%					
20	5 & Over	0.0439%	0.0146%	4.50%	5.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0481%	0.0153%	3.54%	3.80%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0426%	0.0203%	2.66%	2.90%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0517%	0.0305%	2.14%	2.30%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0689%	0.0425%	1.48%	1.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1088%	0.0628%	1.20%	1.30%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1781%	0.1014%	1.20%	1.20%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2787%	0.1688%	1.20%	1.20%	2.32%	2.65%	0.60%	3.25%	3.85%
60		0.4798%	0.2616%	1.20%	1.20%	2.60%	2.75%	0.40%	3.25%	3.65%
65		0.9161%	0.3883%	1.20%	1.20%	2.60%	2.75%	0.16%	3.25%	3.41%
70	1.5905%	0.6522%	1.20%	1.20%	2.60%	2.75%	0.00%	3.25%	3.25%	
Ref		#2133x1sb0	#2134x1sb0	753 #876x1	1037 #575x1	#1095x1	#1096x1	485		

\*Applicable rates during the 2019 Calendar Year. Rates in future years are determined by the above rates and the MP-2015 projection scale.

The pay increase assumptions are age based only, and not service based.

## Single Life Retirement Values

Sample Attained Ages*	Present Value of \$1 Monthly for Life Increasing 3.0% Annually (First Increase After 1 Year)		Future Life Expectancy (Years)	
	Males	Females	Males	Females
50	\$193.48	\$202.29	33.85	37.31
55	180.88	190.76	29.11	32.35
60	165.62	176.83	24.51	27.55
65	147.79	160.36	20.14	22.96
70	127.87	141.27	16.08	18.61
75	106.38	119.94	12.40	14.59
80	84.44	97.35	9.18	10.99
Ref:	:#2135x1sb0	:#2136x1sb0		

\*Attained Age during the 2019 Calendar Year.

## Miscellaneous and Technical Assumptions

### December 31, 2019

<b>Marriage Assumption:</b>	70% of males and 60% of females are assumed to be married for purposes of death-in-service benefits for State and Local members. 90% of males and 90% of females are assumed to be married for purposes of death-in-service benefits for Law members. Male spouses are assumed to be three years older than female spouses for active member valuation purposes. In retired or inactive cases where spouse information is needed, but not available, the three-year age difference is also assumed.
<b>Pay Increase Timing:</b>	Beginning of year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
<b>Final Average Salary:</b>	For present value of future benefit purposes, final average salary was calculated in accordance with pay increase assumptions, but was not permitted to fall below the final average salary reported in the data.
<b>Decrement Timing:</b>	Decrements are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Disability and mortality decrements do not operate during the first 5 years of service.
<b>Death after Disability:</b>	Death after disability benefits were approximated by assuming that the disability benefit would be paid as a joint and 35% survivor benefit for people in the original disability plan and as a joint and 20% survivor benefit for people in the post 1992 plan.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year. A (0.40)% factor is applied to State active member liabilities (other than for refunds) and a (0.50)% factor is applied to Local active member liabilities (other than for refunds) to recognize that a portion of the membership is part time.
<b>Minimum Earnable Salary:</b>	A (1.00)% factor is applied to State and Local active member liabilities (other than for refunds) to recognize the minimum amount that members must earn each month to qualify for full service credit. The minimum earnable salary for calendar year 2020 was \$673.08 per month.

## Miscellaneous and Technical Assumptions December 31, 2019 (Concluded)

<b>Miscellaneous Loads:</b>	<ul style="list-style-type: none"><li>• A load of approximately 0.48% of payroll is included in the computed normal cost to recognize subsidized service purchases.</li><li>• Law active accrued liabilities for retirement are reduced by 10% to recognize that total service reported is not entirely Law service, and that non-Law service cannot be used to satisfy Law eligibility conditions.</li><li>• A load of approximately 0.40% of Traditional Plan and 1.00% of Combined Plan payroll is included in the Traditional and Combined Plan computed normal costs to recognize expected administrative expenses.</li></ul>
<b>Transition Groups Under Senate Bill #343:</b>	A member's transition group (i.e., Group A, Group B, or Group C) was determined as of the valuation date based upon the assumption (for transition group determination only) that active members would continue in active service.
<b>Cost-of-Living Adjustments:</b>	For individuals retiring after January 7, 2013, cost-of-living adjustments were assumed to be 1.40% for calendar year 2020 and 2.15% thereafter.
<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon contribution rates presented in the Summary of Benefits, and the actual payroll payable at the time contributions are made.
<b>Other Contributions:</b>	For amortization purposes, it was assumed that payroll for mitigating contributions (i.e., 3.50% from the Combined and Member Directed Plans and 2.44% from the Alternate Retirement Plan) and payroll for reemployed retirees will grow at the assumed 3.25% wage inflation assumption.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is a straight life benefit, except where otherwise noted.
<b>Missing Member Data and Member Data Adjustments:</b>	Active and inactive records with missing dates of birth, if any, were given dates of birth that resulted in an entry age of 30 based upon the reported service. Active and inactive records with missing gender codes, if any, were assumed to be female. For active members with less than 6 months of service credit and a reported annualized salary greater than \$200,000, the annual salary used for valuation purposes was the greater of the member's reported FAS and non-annualized gross salary.

## **SECTION XI**

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### **FINANCIAL PRINCIPLES**



# Financial Principles and Operational Techniques of OPERS

**Promises Made, and To Be Paid For.** As each year is completed, OPERS in effect hands an “IOU” to each member then acquiring a year of service credit --- the “IOU” says: “The Ohio Public Employees Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related *key financial questions* are:

***Which generation of taxpayers contributes the money to cover the IOU?***

***The present taxpayers***, who receive the benefit of the member’s present year of service? ***Or the future taxpayers***, who happen to be in Ohio at the time the IOU becomes a cash demand, years and often decades later?

***The law governing OPERS financing intends that this year’s taxpayers contribute the money to cover the IOUs being handed out this year.*** With this financial objective, ***the employer contribution rate is expected to remain approximately level from generation to generation of taxpayers.***

There are systems which have a design for deferring contributions to future taxpayers. Lured by a lower contribution rate now, they put aside the consequence that the contribution rate must then relentlessly grow to a level much higher than would be required if a level contribution pattern were followed.

An inevitable by-product of the level-cost design is the accumulation of reserve assets, for decades, and the income produced when the assets are invested. ***Investment income*** becomes ***the 3<sup>rd</sup> and largest contributor*** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members’ service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded actuarial accrued liabilities are the difference between: liabilities for service already rendered; and the accrued assets of OPERS).

**Computing Contributions to Support Fund Benefits.** From a given schedule of benefits and from employee and asset data, the actuary calculates the contribution rates to support the benefits by means of ***an actuarial valuation and a funding method.***

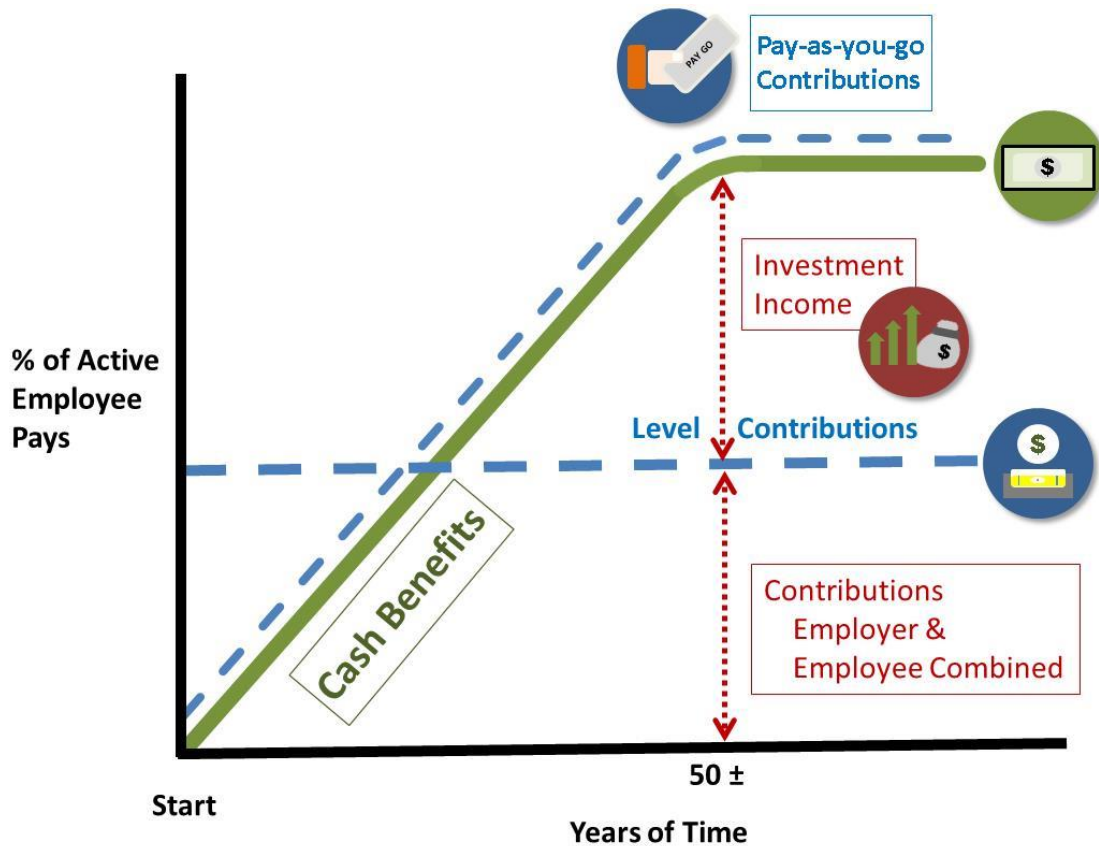
An actuarial valuation has a number of ingredients such as: the rate of investment return which plan assets will earn; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement.

In an actuarial valuation, assumptions must be made as to what the above rates will be for the next year and for decades in the future. The assumptions are established by the Retirement Board after receiving the advice of the actuary.

**Reconciling Differences Between Assumed Experience and Actual Experience.** Once actual experience has occurred and has been observed, it will not coincide exactly with assumed experience, regardless of the skill of the actuary and the many calculations made. The future cannot be predicted with 100% precision.

OPERS copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is ***continuing adjustments in financial position.***

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**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- **Economic Risk Areas**
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- **Non-Economic Risk Areas**
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

## The Actuarial Valuation Process

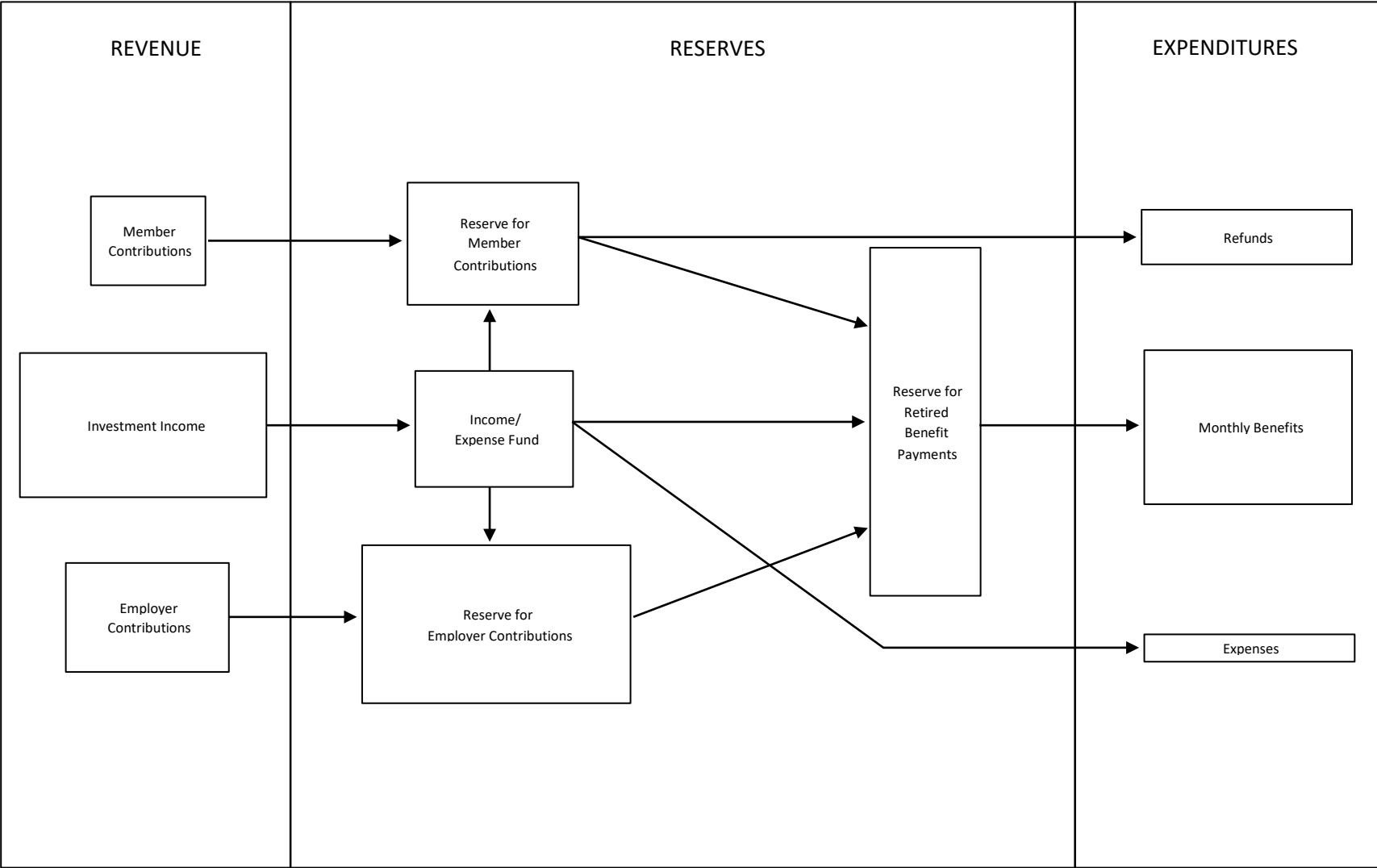
*The financing diagram* on the opposite page shows the relationship between *the two fundamentally different philosophies of paying* for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program) which is thus an *increasing contribution method*; and, the *level contribution method* which attempts to equalize contributions between the generations.

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*The actuarial valuation* is the mathematical process by which the level contribution rate is determined. The activity constituting the valuation may be summarized as follows:

- A. **Census Data**, including:
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
  
- B. + **Asset data** (cash & investments)
  
- C. + **Benefit provisions** that establish eligibility and amounts of payments to members
  
- D. + **Assumptions concerning future experience** in various risk areas
  
- E. + **The funding method** for employer contributions (the long-term, planned pattern for employer contributions)
  
- F. + **Mathematically combining the assumptions, the funding method, and the data**
  
- G. = Determination of:
  - Plan Financial Position; and/or
  - New Employer Contribution Rate

# Flow of Money Through the Retirement System



## Glossary

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

**Accumulated Benefit Obligation.** The actuarial present value of vested and non-vested benefits based on service to date and past and current salary levels.

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

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

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

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

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

**Actuary.** A person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries (MAAA). The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA and ultimately to Fellowship with the designation FSA.

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

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

**Funding Value of Assets.** The value of current plan assets recognized for valuation purposes. Generally based on a phased-in recognition of all or a portion of market related investment return. Sometimes referred to as Actuarial Value of Assets.

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

**Plan Termination Liability.** The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a “going concern” basis and is not normally determined in a routine actuarial valuation.

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

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



## Meaning of “Unfunded Actuarial Accrued Liabilities”

**“Actuarial accrued liabilities”** are **the present value of the portions of promised benefits that are not covered by future normal cost contributions** --- a liability has been established (“accrued”) because the service has been rendered but the resulting monthly cash benefit may not be payable until years in the future.

If “actuarial accrued liabilities” at any time exceed the plan’s accrued assets (cash & investments), the difference is **“unfunded actuarial accrued liabilities.”** This is the common condition. If the plan’s assets equaled the plan’s “actuarial accrued liabilities”, the plan would be termed “fully funded.” This is an unusual condition.

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Each time a plan adds a new benefit which applies to service already rendered, an “actuarial accrued liability” is created, which is also an “unfunded actuarial accrued liability” because the plan can’t print instant cash to cover the value of the new benefit promises. Payment for such unfunded actuarial accrued liabilities is spread over a period of years, commonly in the 15-30 year range.

Unfunded actuarial accrued liabilities can occur in another way: if actual plan experience is less favorable than assumed, the difference is added to unfunded actuarial accrued liabilities. For example, in plans where benefits are directly related to an employee’s pay near time of retirement, unfunded actuarial accrued liabilities increased rapidly during the 1970’s because unexpected rates of pay increase created additional actuarial accrued liabilities which could not be matched by reasonable investment results. Most of the unexpected pay increases were the direct result of inflation, which is a very destructive force on financial stability.

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The existence of unfunded actuarial accrued liabilities is not bad, but the changes from year to year in the amount of unfunded actuarial accrued liabilities are important--- “bad” or “good” or somewhere in between.

Nor are unfunded actuarial accrued liabilities a bill payable immediately, but it is important that policy-makers prevent the amount from becoming unreasonably high and ***it is vital for plans to have a sound method for making payments toward them*** so that they are controlled.

## **SECTION XII**

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### **ADDITIONAL SCHEDULES**

**This information is presented in draft form for review by the System's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the System's financial statements.**

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Traditional, Combined, and Member Directed Plans

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL) @	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll^	UAAL as a % of Covered Payroll
2000	\$46,347	\$46,844	\$ (497)	101 %	\$ 10,192	0 %
2001	49,095	48,748	347	99 %	10,782	3 %
2001*	47,492	48,748	(1,256)	103 %	10,782	0 %
2002	50,872	43,706	7,166	86 %	11,207	64 %
2003	54,774	46,746	8,028	85 %	11,165	72 %
2004	57,604	50,452	7,152	88 %	11,454	62 %
2005	61,146	54,473	6,673	89 %	11,807	57 %
2005*	62,498	54,473	8,025	87 %	11,807	68 %
2006	66,161	61,296	4,865	93 %	12,175	40 %
2007	69,734	67,151	2,583	96 %	12,583	21 %
2008	73,466	55,315	18,150	75 %	12,801	142 %
2009	76,555	57,629	18,926	75 %	12,548	151 %
2010	79,630	60,600	19,031	76 %	12,450	153 %
2010*	80,485	63,649	16,836	79 %	12,450	135 %
2011	84,530	65,436	19,094	77 %	12,399	154 %
2012	87,105	67,855	19,250	78 %	12,193	158 %
2012#	83,878	67,855	16,023	81 %	12,193	131 %
2013	86,645	71,411	15,234	82 %	12,331	124 %
2014	89,285	74,865	14,420	84 %	12,486	114 %
2015	91,832	78,061	13,771	85 %	12,688	106 %
2015*	97,177	78,061	19,116	80 %	12,688	148 %
2016	100,167	80,280	19,887	80 %	13,186	151 %
2017	102,656	83,292	19,364	81 %	13,498	143 %
2017*	106,090	83,292	22,797	79 %	13,498	169 %
2018	108,705	84,287	24,418	78 %	13,807	177 %
2019	111,371	88,572	22,800	80 %	14,380	159 %

@ Valuation years 2015 and prior exclude reserve for Member Directed future adverse experience (if any)

^ In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented. The payroll amounts exclude Member Directed payroll.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Traditional Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll <sup>^</sup>	UAAL as a % of Covered Payroll
2000	\$46,347	\$46,844	\$(497)	101 %	\$ 10,192	0 %
2001	49,095	48,748	347	99 %	10,782	3 %
2001*	47,492	48,748	(1,256)	103 %	10,782	0 %
2002	50,872	43,706	7,166	86 %	11,207	64 %
2003	54,756	46,737	8,019	85 %	11,056	73 %
2004	57,573	50,430	7,143	88 %	11,313	63 %
2005	61,099	54,433	6,666	89 %	11,633	57 %
2005*	62,447	54,433	8,014	87 %	11,633	69 %
2006	66,089	61,235	4,854	93 %	11,971	41 %
2007	69,639	67,067	2,572	96 %	12,347	21 %
2008	73,346	55,230	18,116	75 %	12,546	144 %
2009	76,407	57,519	18,888	75 %	12,290	154 %
2010	79,459	60,461	18,997	76 %	12,165	156 %
2010*	80,307	63,515	16,792	79 %	12,165	138 %
2011	84,325	65,274	19,052	77 %	12,103	157 %
2012	86,876	67,670	19,206	78 %	11,884	162 %
2012#	83,664	67,670	15,994	81 %	11,884	135 %
2013	86,407	71,175	15,232	82 %	12,000	127 %
2014	89,017	74,567	14,450	84 %	12,140	117 %
2015	91,535	77,700	13,835	85 %	12,321	110 %
2015*	96,863	77,700	19,163	80 %	12,321	152 %
2016	99,818	79,865	19,953	80 %	12,794	156 %
2017	102,274	82,797	19,477	81 %	13,085	149 %
2017*	105,691	82,797	22,894	78 %	13,085	175 %
2018	108,265	83,715	24,549	77 %	13,376	184 %
2019	110,887	87,903	22,984	79 %	13,932	165 %

<sup>^</sup> In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts in Millions) Combined Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll <sup>^</sup>	UAAL as a % of Covered Payroll
2000						
2001						
2001						
2002						
2003	\$ 18	\$ 9	\$ 9	50 %	\$109	8 %
2004	31	22	9	71 %	141	6 %
2005	47	40	7	85 %	174	4 %
2005*	51	40	11	78 %	174	6 %
2006	72	61	11	85 %	205	5 %
2007	95	84	11	88 %	236	5 %
2008	120	85	35	71 %	255	14 %
2009	148	110	38	74 %	258	15 %
2010	171	138	33	81 %	284	12 %
2010*	177	134	43	76 %	284	15 %
2011	203	161	42	79 %	296	14 %
2012	226	183	43	81 %	310	14 %
2012#	212	183	29	86 %	310	9 %
2013	230	229	1	100 %	331	0 %
2014	260	289	(29)	111 %	346	0 %
2015	288	350	(62)	122 %	367	0 %
2015*	303	350	(47)	116 %	367	0 %
2016	336	402	(66)	120 %	392	0 %
2017	365	479	(113)	131 %	413	0 %
2017*	382	479	(97)	125 %	413	0 %
2018	420	552	(132)	131 %	431	0 %
2019	461	646	(185)	140 %	448	0 %

<sup>^</sup> In 2014 and thereafter reported by the OPERS Staff to GRS. Prior to 2014, valuation payroll is presented.

\* Revised actuarial assumptions.

# After benefit changes.

## Schedule of Defined Benefit Funding Progress (\$ Amounts) Member Directed Plan

The schedule below measures the funding progress with respect to the **retirement allowance** portion of OPERS benefits. Assets and liabilities related to post-employment health care benefits are specifically excluded from the schedule. Assets do, however, include market value adjustments.

Valuation Year	Actuarial Accrued Liabilities (AAL) @	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Covered Payroll	UAAL as a % of Covered Payroll
2000						
2001						
2001						
2002						
2003						
2004						
2005						
2005*						
2006						
2007						
2008	\$ 166,354	\$ 147,976	\$ 18,378	89 %	NA	NA
2009	252,670	205,639	47,031	81 %	NA	NA
2010	489,792	438,982	50,810	90 %	NA	NA
2010*	496,004	454,025	41,979	92 %	NA	NA
2011	1,172,900	1,156,151	16,749	99 %	NA	NA
2012	2,665,552	2,523,879	141,673	95 %	NA	NA
2013	6,884,231	6,826,536	57,695	99 %	NA	NA
2014	8,291,077	8,771,712	(480,635)	106 %	NA	NA
2015	9,767,164	10,622,057	(854,893)	109 %	NA	NA
2015*	10,290,582	10,622,057	(331,475)	103 %	NA	NA
2016	12,961,105	12,961,105	0	100 %	NA	NA
2017	16,770,041	16,770,041	0	100 %	NA	NA
2017*	16,770,041	16,770,041	0	100 %	NA	NA
2018	19,916,815	19,916,815	0	100 %	NA	NA
2019	22,821,267	22,821,267	0	100 %	NA	NA

@ Valuation years 2015 and prior exclude reserve for Member Directed future adverse experience (if any).

\* Revised actuarial assumptions.

## Schedule of Employer Contributions\*

Traditional Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2004	2006	8.44%
2005	2008	7.12%
2006	2009	7.13%
2007	2010	7.14%
2008	2011	13.33%
2009	2012	13.64%
2010	2013	13.52%
2011	2014	14.15%
2012	2015	11.16%
2013	2016	10.16%
2014	2017	10.16%
2015	2018	14.16%
2016	2019	14.17%
2017	2020	14.17%
2018	2021	14.18%
2019	2022	14.18%

Combined Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2004	2006	8.33%
2005	2008	7.29%
2006	2009	7.33%
2007	2010	7.22%
2008	2011	10.00%
2009	2012	10.00%
2010	2013	13.00%
2011	2014	14.00%
2012	2015	11.00%
2013	2016	10.00%
2014	2017	10.00%
2015	2018	14.00%
2016	2019	14.00%
2017	2020	14.00%
2018	2021	14.00%
2019	2022	14.00%

Member Directed Plan		
Valuation Date December 31	Year Ended December 31	Annual Required Contributions
2008	2011	\$ 1,570
2009	2012	4,019
2010	2013	4,342
2011	2014	1,669
2012	2015	14,121
2013	2016	5,751
2014	2017	0
2015	2018	0
2016	2019	0
2017	2020	0
2018	2021	0
2019	2022	0

\* The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

## Schedule of Unfunded Actuarial Accrued Liability@ Traditional, Combined and Member Directed Plans

	December 31, 2019					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 15,692,428,529	\$ 23,363,776,025	\$ 39,056,204,554	\$ 10,059,591	\$ 2,155,890,630	\$ 41,222,154,775
Retirees and Beneficiaries	28,103,186,888	39,181,891,945	67,285,078,833	53,776,399	2,810,286,796	70,149,142,028
Total Accrued Liabilities	\$ 43,795,615,417	\$ 62,545,667,970	\$ 106,341,283,387	\$ 63,835,990	\$ 4,966,177,426	\$ 111,371,296,803
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 1,144,209,787	\$ 4,386,235,106	\$ 5,530,444,893	\$ (18,953,521)	\$ 812,049,795	\$ 6,323,541,167
ESF	5,725,711,526	8,721,605,815	14,447,317,341	3,852,960	761,663,184	15,212,833,485
Unallocated	49,187,156	73,560,903	122,748,059	54,839	6,216,102	129,019,000
Funding Value of Assets Adjustment	(1,236,934,290)	(1,849,437,762)	(3,086,372,052)	(1,368,108)	(155,078,403)	(3,242,818,563)
Total Active and Inactive Assets	\$ 5,682,174,179	\$ 11,331,964,062	\$ 17,014,138,241	\$ (16,413,830)	\$ 1,424,850,678	\$ 18,422,575,089
Retirees and Beneficiaries						
A & PR Fund*	\$ 27,340,068,263	\$ 37,946,299,112	\$ 65,286,367,375	\$ 28,664,339	\$ 2,740,354,336	\$ 68,055,386,050
SBF Fund*	761,863,421	1,234,088,886	1,995,952,307	25,112,060	69,932,460	2,090,996,827
Reserve for Future MD Adverse Experience^	1,255,204	1,503,947	2,759,151	0	0	2,759,151
Total R&B Assets	\$ 28,103,186,888	\$ 39,181,891,945	\$ 67,285,078,833	\$ 53,776,399	\$ 2,810,286,796	\$ 70,149,142,028
Total Assets	\$ 33,785,361,067	\$ 50,513,856,007	\$ 84,299,217,074	\$ 37,362,569	\$ 4,235,137,474	\$ 88,571,717,117
Unfunded Actuarial Accrued Liability	\$ 10,010,254,350	\$ 12,031,811,963	\$ 22,042,066,313	\$ 26,473,421	\$ 731,039,952	\$ 22,799,579,686

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

^ Includes funds for pending Member Directed retirements.



## Schedule of Unfunded Actuarial Accrued Liability@ Traditional Plan

	December 31, 2019					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 15,510,412,447	\$ 23,122,062,928	\$ 38,632,475,375	\$ 10,059,591	\$ 2,155,890,630	\$ 40,798,425,596
Retirees and Beneficiaries	28,081,803,618	39,142,995,676	67,224,799,294	53,776,399	2,810,286,796	70,088,862,489
Total Accrued Liabilities	\$ 43,592,216,065	\$ 62,265,058,604	\$ 105,857,274,669	\$ 63,835,990	\$ 4,966,177,426	\$ 110,887,288,085
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 883,367,391	\$ 4,017,952,022	\$ 4,901,319,413	\$ (18,953,521)	\$ 812,049,795	\$ 5,694,415,687
ESF	5,724,810,580	8,718,985,818	14,443,796,398	3,852,960	761,663,184	15,209,312,542
Unallocated	49,187,156	73,560,903	122,748,059	54,839	6,216,102	129,019,000
Funding Value of Assets Adjustment	(1,227,113,877)	(1,835,186,514)	(3,062,300,391)	(1,368,108)	(155,078,403)	(3,218,746,902)
Total Active and Inactive Assets	\$ 5,430,251,250	\$ 10,975,312,229	\$ 16,405,563,479	\$ (16,413,830)	\$ 1,424,850,678	\$ 17,814,000,327
Retirees and Beneficiaries						
A & PR Fund*	\$ 27,319,940,197	\$ 37,908,906,790	\$ 65,228,846,987	\$ 28,664,339	\$ 2,740,354,336	\$ 67,997,865,662
SBF Fund*	761,863,421	1,234,088,886	1,995,952,307	25,112,060	69,932,460	2,090,996,827
Total R&B Assets	\$ 28,081,803,618	\$ 39,142,995,676	\$ 67,224,799,294	\$ 53,776,399	\$ 2,810,286,796	\$ 70,088,862,489
Total Assets	\$ 33,512,054,868	\$ 50,118,307,905	\$ 83,630,362,773	\$ 37,362,569	\$ 4,235,137,474	\$ 87,902,862,816
Unfunded Actuarial Accrued Liability	\$ 10,080,161,197	\$ 12,146,750,699	\$ 22,226,911,896	\$ 26,473,421	\$ 731,039,952	\$ 22,984,425,269

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

## Schedule of Unfunded Actuarial Accrued Liability@ Combined Plan

	December 31, 2019					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 182,016,082	\$ 241,713,097	\$ 423,729,179			\$ 423,729,179
Retirees and Beneficiaries	13,794,823	23,663,449	37,458,272			37,458,272
<b>Total Accrued Liabilities</b>	<b>\$ 195,810,905</b>	<b>\$ 265,376,546</b>	<b>\$ 461,187,451</b>			<b>\$ 461,187,451</b>
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 260,520,251	\$ 367,678,961	\$ 628,199,212			\$ 628,199,212
ESF	883,676	2,542,790	3,426,466			3,426,466
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(9,480,998)	(13,569,918)	(23,050,916)			(23,050,916)
<b>Total Active and Inactive Assets</b>	<b>\$ 251,922,929</b>	<b>\$ 356,651,833</b>	<b>\$ 608,574,762</b>			<b>\$ 608,574,762</b>
Retirees and Beneficiaries						
A & PR Fund*	\$ 13,794,823	\$ 23,663,449	\$ 37,458,272			\$ 37,458,272
SBF Fund*	0	0	0			0
<b>Total R&amp;B Assets</b>	<b>\$ 13,794,823</b>	<b>\$ 23,663,449</b>	<b>\$ 37,458,272</b>			<b>\$ 37,458,272</b>
<b>Total Assets</b>	<b>\$ 265,717,752</b>	<b>\$ 380,315,282</b>	<b>\$ 646,033,034</b>			<b>\$ 646,033,034</b>
<b>Unfunded Actuarial Accrued Liability</b>	<b>\$ (69,906,847)</b>	<b>\$ (114,938,736)</b>	<b>\$ (184,845,583)</b>			<b>\$ (184,845,583)</b>

@ The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

## Schedule of Unfunded Actuarial Accrued Liability<sup>@</sup> DB Portion of Member Directed Plan

	December 31, 2019					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
<b>Accrued Liabilities</b>						
Active and Inactive Members	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries	7,588,447	15,232,820	22,821,267			22,821,267
Total Accrued Liabilities	\$ 7,588,447	\$ 15,232,820	\$ 22,821,267			\$ 22,821,267
<b>Assets</b>						
Active and Inactive Members						
EAF*	\$ 322,145	\$ 604,123	\$ 926,268			\$ 926,268
ESF	17,270	77,207	94,477			94,477
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(339,415)	(681,330)	(1,020,745)			(1,020,745)
Total Active and Inactive Assets	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries						
A & PR Fund*	\$ 6,333,243	\$ 13,728,873	\$ 20,062,116			\$ 20,062,116
SBF Fund*	0	0	0			0
Reserve for Future Adverse Experience^	1,255,204	1,503,947	2,759,151			2,759,151
Total R&B Assets	\$ 7,588,447	\$ 15,232,820	\$ 22,821,267			\$ 22,821,267
Total Assets	\$ 7,588,447	\$ 15,232,820	\$ 22,821,267			\$ 22,821,267
Unfunded Actuarial Accrued Liability	\$ 0	\$ 0	\$ 0			\$ 0

<sup>@</sup> The amounts reported in this schedule do not include contributions for post-employment healthcare benefits.

\* After reserve transfers.

^ Includes funds for pending Member Directed retirements.

## Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest valuation date follows:

Valuation date	December 31, 2019		
Actuarial cost method	Individual entry age		
Amortization method for unfunded actuarial accrued liabilities	Level percent closed - Traditional and Combined Level dollar closed - Member-Directed		
Equivalent Single Amortization Period			
Traditional Plan	23 years	(Ending December 31, 2043)	
Combined Plan	N/A	(Plan has funded ratio of at least 100%)	
Member-Directed Plan	N/A	(Plan has funded ratio of at least 100%)	
Asset valuation method	4-year smoothed market		
Actuarial assumptions:			
Investment rate of return	7.20%		
Projected salary increases including wage inflation at 3.25%	3.25% - 10.75%		
Cost-of-living adjustments	Pre 1/7/2013 Retirees: 3.0% simple Post 1/7/2013 Retirees: 1.4% for calendar year 2020, then 2.15% simple		

		<b>Traditional</b>	<b>Combined</b>	<b>Member Directed</b>	<b>Total</b>
Retirees and beneficiaries receiving benefits		220,448	659	317	221,424
Terminated plan members entitled to but not yet receiving benefits					
Less than 5 years of service		596,241	1,404	0	597,645
5 or more years of service		37,326	828	0	38,154
Total		633,567	2,232	0	635,799
Active plan members					
Less than 5 years of service		119,214	2,439	0	121,653
5 or more years of service		166,629	5,110	0	171,739
Total		285,843	7,549	0	293,392
Total					
Less than 5 years of service		715,455	3,843	0	719,298
5 or more years of service		424,403	6,597	317	431,317
Total		1,139,858	10,440	317	1,150,615





August 21, 2020

Ms. Karen E. Carraher  
Executive Director  
Ohio Public Employees Retirement System  
277 East Town Street  
Columbus, Ohio 43215

**Re: Report of the December 31, 2019 Actuarial Valuation**

Dear Karen:

Enclosed are the 20 bound copies of the final report.

Sincerely,

A handwritten signature in black ink that reads "Brian B. Murphy". The signature is written in a cursive, flowing style.

Brian B. Murphy, FSA, EA, MAAA, FCA

BBM:sc  
Enclosures

cc: Ms. Tonia Wildasin  
CliftonLarsonAllen LLP