

Ohio Public Employees Retirement System

Actuarial Valuation of Defined Benefit Allowances –
Traditional, Combined and Member Directed Plans
December 31, 2020



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September 1, 2021

The Retirement Board
Ohio Public Employees Retirement System
Columbus, Ohio

Ladies and Gentlemen:

The results of the **December 31, 2020 Annual Actuarial Valuation of Defined Benefit Allowances** of the Ohio Public Employees Retirement System (OPERS), based upon Chapter 145 of the Revised Code of Ohio (ORC) 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. 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 subject to statutory limits,
 - 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, 2020 valuation establishes employer contribution rates for calendar year 2023.
- Assist the Board in establishing the employer rate allocation between pension and retiree health,
- 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.

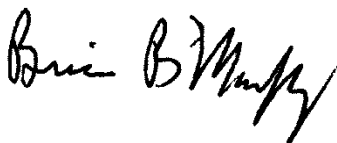
The actuarial assumptions used in the valuation are summarized in Section X of this report. The assumptions are established by the Retirement Board after consulting with the actuary.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

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:ah



SECTION I

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, 2020 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 subject to statutory limits,
 - 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, 2020 valuation establishes employer contribution rates for calendar year 2023.
- Assist the Board in establishing the employer rate allocation between pension and retiree health,
- 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.

Total employer and member contribution rates by division, as well as the allocation of the employer contribution rate between pension and retiree health was based upon information known as of the valuation date.



Summary of Pension Defined Benefit Valuation Results

Traditional, Combined, and Member Directed Plans

December 31

(\$ in Millions)

	2020						2019	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
A. Demographic Information								
1. Number Counts								
a. Active Members								
i. Traditional Plan (TP)	95,066	168,219	263,285	55	8,005	8,060	271,345	285,843
ii. Combined Plan (CP)	2,678	4,586	7,264	0	0	0	7,264	7,549
iii. Member Directed Plan (MD)	3,587	6,417	10,004	0	0	0	10,004	10,525
iv. Total	101,331	179,222	280,553	55	8,005	8,060	288,613	303,917
b. Retired Number Counts	76,325	141,622	217,947	193	5,512	5,705	223,652	221,424
c. Deferred/Inactive Number Counts	304,462	352,667	657,129	58	1,361	1,419	658,548	635,799
d. Total Number Counts	482,118	673,511	1,155,629	306	14,878	15,184	1,170,813	1,161,140
2. Active Payroll								
a. DB Active Members								
i. Traditional Plan (TP)	\$ 5,232	\$ 7,686	\$ 12,918	\$ 3	\$ 578	\$ 581	\$ 13,499	\$ 13,528
ii. Combined Plan (CP)	184	256	439	0	0	0	439	439
b. Other Payroll								
i. Reemployed Retirees	\$ 91	\$ 305	\$ 396				\$ 396	\$ 404
ii. Member Directed Plan (MD)	234	376	610				610	599
iii. Alternative Retirement Plan (ARP)	585	0	585				585	579
B. Defined Benefit Assets								
1. Market Value (MV)	\$ 37,624	\$ 56,386	\$ 94,010	\$ 37	\$ 4,806	\$ 4,843	\$ 98,853	\$ 91,815
2. Rate of Return on MV							11.60 %	17.08 %
3. Funding Value (FV)	\$ 35,765	\$ 53,600	\$ 89,366	\$ 35	\$ 4,569	\$ 4,604	\$ 93,969	\$ 88,572
4. Rate of Return on FV							10.15 %	9.11 %
5. Ratio of FV to MV							95.1%	96.5%
C. Defined Benefit Actuarial Results								
1. TP & CP Normal Cost as a % of Payroll	14.28%	14.16%	14.20%	18.37%	21.03%	21.01%	14.50%	14.55%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 14,778	\$ 21,599	\$ 36,377	\$ 8	\$ 2,172	\$ 2,179	\$ 38,557	\$ 38,398
b. Retired	28,732	40,134	68,866	56	2,896	2,952	71,818	70,149
c. Deferred/Inactive	1,210	1,729	2,939	1	57	58	2,997	2,824
d. Total	\$ 44,720	\$ 63,462	\$ 108,182	\$ 64	\$ 5,125	\$ 5,189	\$ 113,372	\$ 111,371
3. Unfunded AAL (UAAL) (FV Basis)	\$ 8,955	\$ 9,862	\$ 18,817	\$ 29	\$ 557	\$ 586	\$ 19,402	\$ 22,800
4. Unfunded AAL (UAAL) (MV Basis)	\$ 7,096	\$ 7,076	\$ 14,172	\$ 27	\$ 319	\$ 346	\$ 14,519	\$ 19,556
5. Funded Ratio (FV Basis)	80.0 %	84.5 %	82.6 %	54.5 %	89.1 %	88.7 %	82.9 %	79.5 %
D. Amortization Years to Fully Amortize UAAL *								
	24	15	18	N/A	10	11	18	23
E. Defined Benefit Contribution Rates								
1. Pension Contributions								
a. Employer Normal Cost	4.67%	4.52%	4.57%	6.37%	8.03%	8.01%	4.73%	4.79%
b. Member Contribution Rate #	9.61%	9.64%	9.63%	12.00%	13.00%	13.00%	9.77%	9.76%
c. UAAL Contribution Rate	9.33%	9.48%	9.43%	11.73%	10.07%	10.09%	9.45%	9.38%
d. Total	23.61%	23.64%	23.63%	30.10%	31.10%	31.10%	23.95%	23.93%
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%	14.17%

* Based on i) schedule of employer and member contribution rates shown on page III-4 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 December 31, 2020 results, the amortization years shown are from December 31, 2021. Amortization years are determined based upon scheduled contribution rate changes, if any, through calendar year 2023.

Weighted average of the Traditional Plan and Combined Plan defined benefit plan member contribution rates.



Summary of Pension Defined Benefit Valuation Results

Traditional Plan

December 31

(\$ in Millions)

	2020						2019	
	General			Law			Grand Total	Grand Total
	State	Local	Total General	Public Safety	Law Enforcement	Total Law		
A. Demographic Information								
1. Number Counts								
a. Active Members	95,066	168,219	263,285	55	8,005	8,060	271,345	285,843
b. Retired Number Counts	76,004	140,868	216,872	193	5,512	5,705	222,577	220,448
c. Deferred/Inactive Number Counts	303,463	351,311	654,774	58	1,361	1,419	656,193	633,567
d. Total Number Counts	474,533	660,398	1,134,931	306	14,878	15,184	1,150,115	1,139,858
2. Active Payroll								
a. DB Active Members	\$ 5,232	\$ 7,686	\$ 12,918	\$ 3	\$ 578	\$ 581	\$ 13,499	\$ 13,528
b. Other Payroll								
i. Reemployed Retirees	\$ 91	\$ 305	\$ 396				\$ 396	\$ 404
ii. Member Directed Plan (MD)	234	376	610				610	\$ 599
iii. Alternative Retirement Plan (ARP)	585	0	585				585	\$ 579
B. Defined Benefit Assets								
1. Market Value (MV)	\$ 37,283	\$ 55,898	\$ 93,182	\$ 37	\$ 4,806	\$ 4,843	\$ 98,025	\$ 91,122
2. Rate of Return on MV							11.60 %	17.08 %
3. Funding Value (FV)	\$ 35,441	\$ 53,136	\$ 88,577	\$ 35	\$ 4,569	\$ 4,604	\$ 93,180	\$ 87,903
4. Rate of Return on FV							10.15 %	9.11 %
5. Ratio of FV to MV							95.1%	96.5%
C. Defined Benefit Actuarial Results								
1. Normal Cost as a % of Payroll	14.52%	14.39%	14.43%	18.37%	21.03%	21.01%	14.73%	14.78%
2. Actuarial Accrued Liability (AAL)								
a. Active	\$ 14,588	\$ 21,353	\$ 35,941	\$ 8	\$ 2,172	\$ 2,179	\$ 38,120	\$ 37,993
b. Retired	28,702	40,083	68,785	56	2,896	2,952	71,737	70,089
c. Deferred/Inactive	1,201	1,716	2,917	1	57	58	2,975	2,805
d. Total	\$ 44,490	\$ 63,153	\$ 107,643	\$ 64	\$ 5,125	\$ 5,189	\$ 112,833	\$ 110,887
3. Unfunded AAL (UAAL) (FV Basis)	\$ 9,049	\$ 10,017	\$ 19,066	\$ 29	\$ 557	\$ 586	\$ 19,652	\$ 22,984
4. Unfunded AAL (UAAL) (MV Basis)	\$ 7,207	\$ 7,255	\$ 14,461	\$ 27	\$ 319	\$ 346	\$ 14,808	\$ 19,765
5. Funded Ratio (FV Basis)	79.7 %	84.1 %	82.3 %	54.5 %	89.1 %	88.7 %	82.6 %	79.3 %
D. Amortization Years to Fully Amortize UAAL *	24	15	19	N/A	10	11	18	23
E. Contribution Rates								
	CY 2023						CY 2022	
1. Pension Contributions								
a. Employer Normal Cost	4.52%	4.39%	4.43%	6.37%	8.03%	8.01%	4.60%	4.65%
b. Member Contribution Rate	10.00%	10.00%	10.00%	12.00%	13.00%	13.00%	10.13%	10.13%
c. UAAL Contribution Rate	9.48%	9.61%	9.57%	11.73%	10.07%	10.09%	9.58%	9.53%
d. Total	24.00%	24.00%	24.00%	30.10%	31.10%	31.10%	24.31%	24.31%
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-4 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 December 31, 2020 results, the amortization years shown are from December 31, 2021. Amortization years are determined based upon scheduled contribution rate changes, if any, through calendar year 2023.



Summary of Pension Defined Benefit Valuation Results

Combined Plan

December 31

(\$ in Millions)

	2020		2019	
	General		Grand Total	Grand Total
	State	Local		
A. Demographic Information				
1. Number Counts				
a. Active Members	2,678	4,586	7,264	7,549
b. Retired Number Counts	231	513	744	659
c. Deferred/Inactive Number Counts	999	1,356	2,355	2,232
d. Total Number Counts	3,908	6,455	10,363	10,440
2. Active Payroll	\$ 184	\$ 256	\$ 439	\$ 439
B. Defined Benefit Assets				
1. Market Value (MV)	\$ 325	\$ 464	\$ 789	\$ 669
2. Rate of Return on MV			11.57 %	17.06 %
3. Funding Value (FV)	\$ 310	\$ 442	\$ 752	\$ 646
4. Rate of Return on FV			9.82 %	8.92 %
5. Ratio of FV to MV			95%	97%
C. Defined Benefit Actuarial Results				
1. Normal Cost as a % of Payroll	7.49%	7.57%	7.53%	7.52%
2. Actuarial Accrued Liability (AAL)				
a. Active	\$ 191	\$ 246	\$ 437	\$ 404
b. Retired	16	28	44	37
c. Deferred/Inactive	9	12	22	19
d. Total	\$ 216	\$ 286	\$ 502	\$ 461
3. Unfunded AAL (UAAL) (FV Basis)	\$ (94)	\$ (156)	\$ (250)	\$ (185)
4. Unfunded AAL (UAAL) (MV Basis)	\$ (109)	\$ (178)	\$ (287)	\$ (208)
5. Funded Ratio (FV Basis)	143.6 %	154.4 %	149.8 %	140.1 %
D. Amortization Years to Fully Amortize UAAL *	0	0	0	0
E. Contribution Rates				
	CY 2023		CY 2022	
1. Total Normal Cost	7.49%	7.57%	7.53%	7.52%
2. Member Contribution Rate	0.00%	0.00%	0.00%	0.00%
3. Employer Normal Cost	7.49%	7.57%	7.53%	7.52%
4. Other Contributions #	6.51%	6.43%	6.47%	6.48%
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-4 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 December 31, 2020 results, the amortization years shown are from December 31, 2021. Amortization years are determined based upon scheduled contribution rate changes, if any, through calendar year 2023.

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

	2020			2019	
	General			Grand Total	Grand Total
	State	Local	Total General		
A. Demographic Information					
1. Number Counts					
a. Active Members	3,587	6,417	10,004	10,004	10,525
b. Retired Number Counts	90	241	331	331	317
c. Deferred/Inactive Number Counts	0	0	0	0	0
d. Total Number Counts	3,677	6,658	10,335	10,335	10,842
2. Active Payroll (\$ in Millions)	\$ 234	\$ 376	\$ 610	\$ 610	\$ 599
B. Defined Benefit Assets					
1. Market Value (MV)	\$ 15,016,448	\$ 23,878,836	\$ 38,895,284	\$ 38,895,284	\$ 23,842,012
2. Rate of Return on MV				12.15 %	18.21 %
3. Funding Value (FV)	\$ 14,342,917	\$ 22,807,802	\$ 37,150,719	\$ 37,150,719	\$ 22,821,267
4. Rate of Return on FV				10.05 %	9.41 %
5. Ratio of FV to MV				95.5%	95.7%
C. Defined Benefit Actuarial Results					
1. Normal Cost as a % of Payroll					
2. Actuarial Accrued Liability (AAL)					
a. Active	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
b. Retired	14,342,917	22,807,802	37,150,719	37,150,719	22,821,267
c. Deferred/Inactive	0	0	0	0	0
d. Total	\$ 14,342,917	\$ 22,807,802	\$ 37,150,719	\$ 37,150,719	\$ 22,821,267
3. Unfunded AAL (UAAL) (FV Basis)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
4. Unfunded AAL (UAAL) (MV Basis)	\$ (673,531)	\$ (1,071,034)	\$ (1,744,565)	\$ (1,744,565)	\$ (1,020,745)
5. Funded Ratio (FV Basis)				100.0 %	100.0 %

Comments and Conclusion

The December 31, 2020 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); and
- 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 18 years for the System in total.

Experience. The computed amortization period, taking into account all scheduled increases in contribution rates (currently none), is 18 years compared with the 23-year period that had been reported in the December 31, 2019 valuation. In aggregate, experience was more favorable than expectations during the 2020 calendar year. Primary factors which typically would contribute to changes in the amortization years were:

- Measured on a market value basis, investment return was 11.60%. This figure is based upon an actuarial calculation and may not agree with figures reported elsewhere. The return on the funding value was 10.15%. 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.
- Year over year increases in pay for the active membership was lower than expected, placing downward pressure on the computed amortization period.
- Retirees who retired after 1/7/2013 receive a 0.50% Cost-of-Living Adjustment (COLA) for the calendar year 2021, 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 2020 experience including other sources of gains and losses is presented on pages I-16 through I-19.

Conclusion. Based on the results of the December 31, 2020 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 18 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.

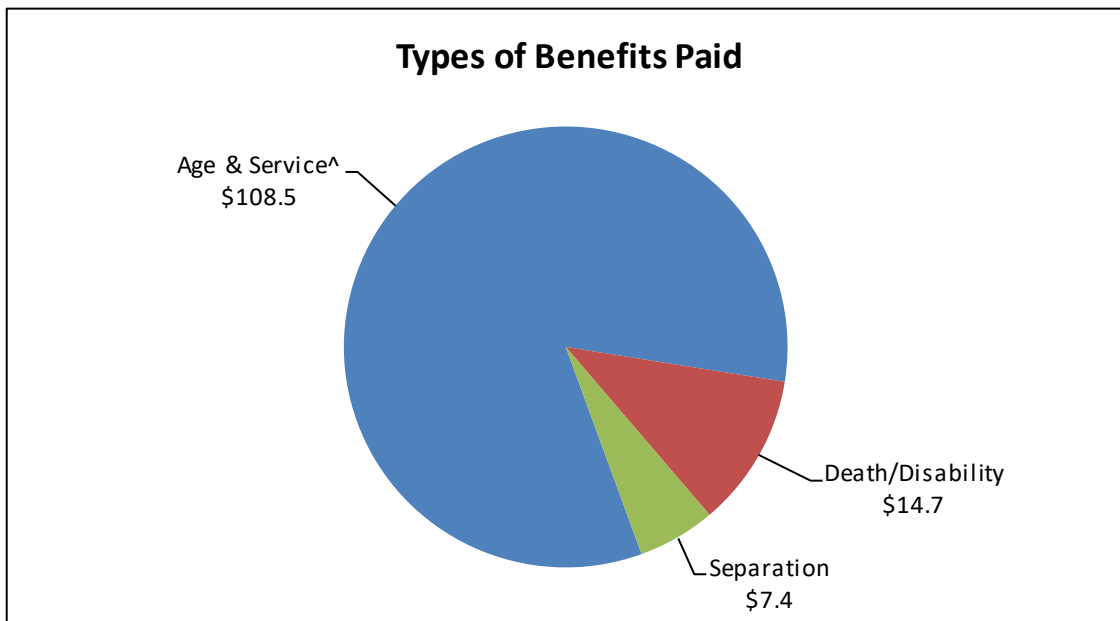
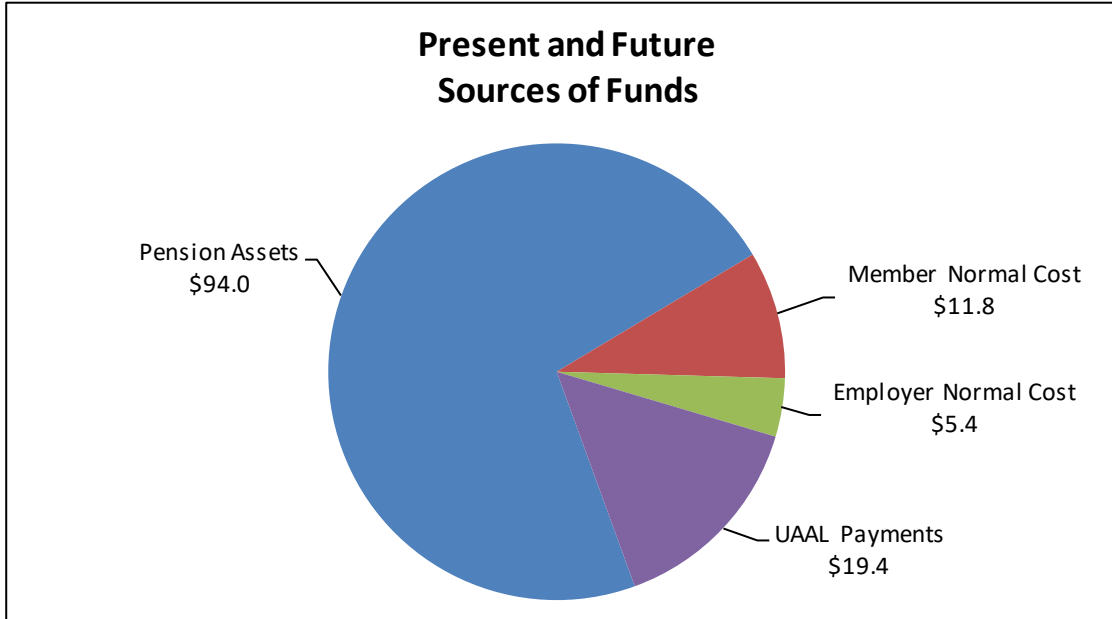
This valuation assumes the continuing ability of the employers to make the contributions necessary to fund the System. A determination regarding whether or not the employers are actually able to do so is outside our scope of expertise and was not performed.

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 \$130.6 Billion* of Defined Benefit Promises for Present Active and Retired Members December 31, 2020 (Dollar Amounts in Billions)



* Present value of future benefits – all divisions combined.

^ 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 %	
2020	97,744	42.2	10.4	55,410	6.4 %		
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 %	
2020	172,805	46.6	11.0	45,954	4.3 %		
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 %	
2020	8,060	41.4	14.6	72,060	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 %	
	2020	278,609	44.9	10.9	50,027	5.1 %	

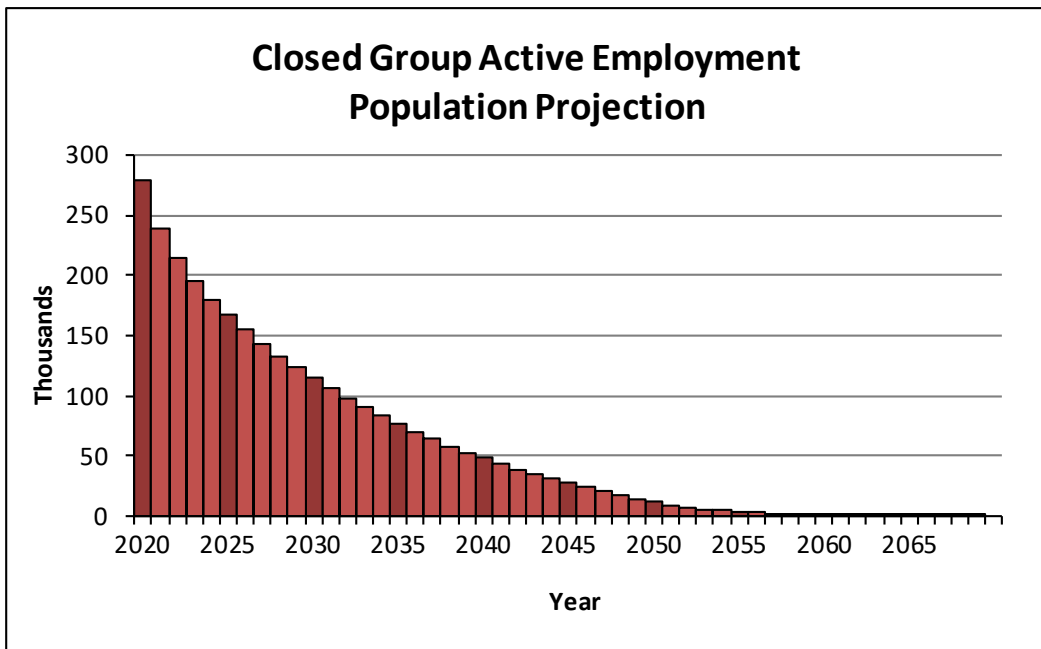
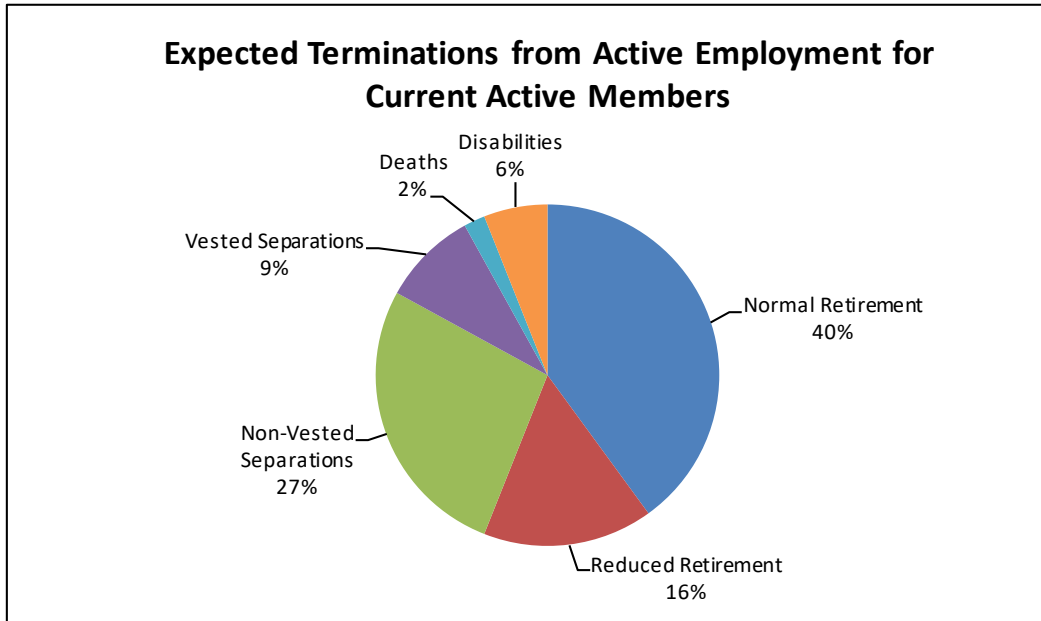
@ 5-year annual compound rate.

* 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.



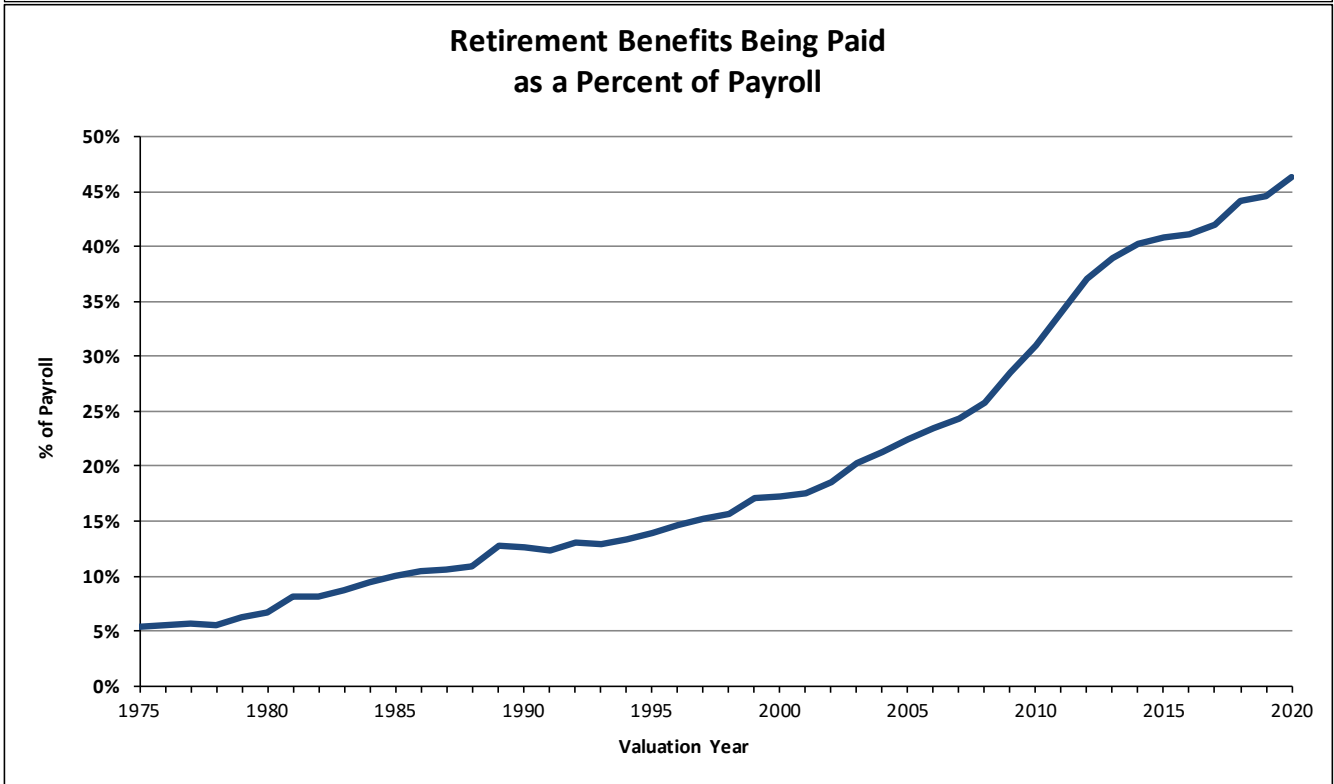
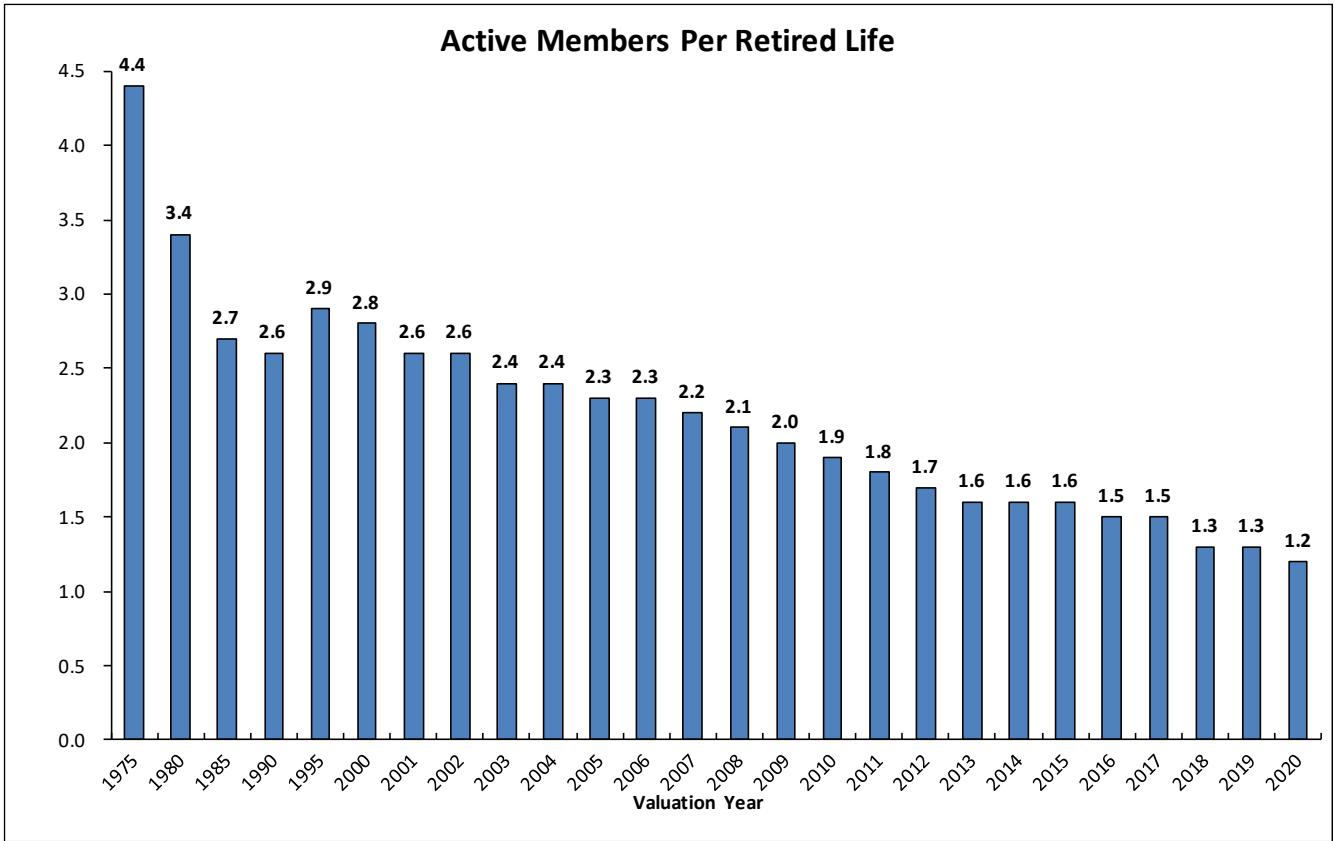
Development of Present Defined Benefit Population December 31, 2020



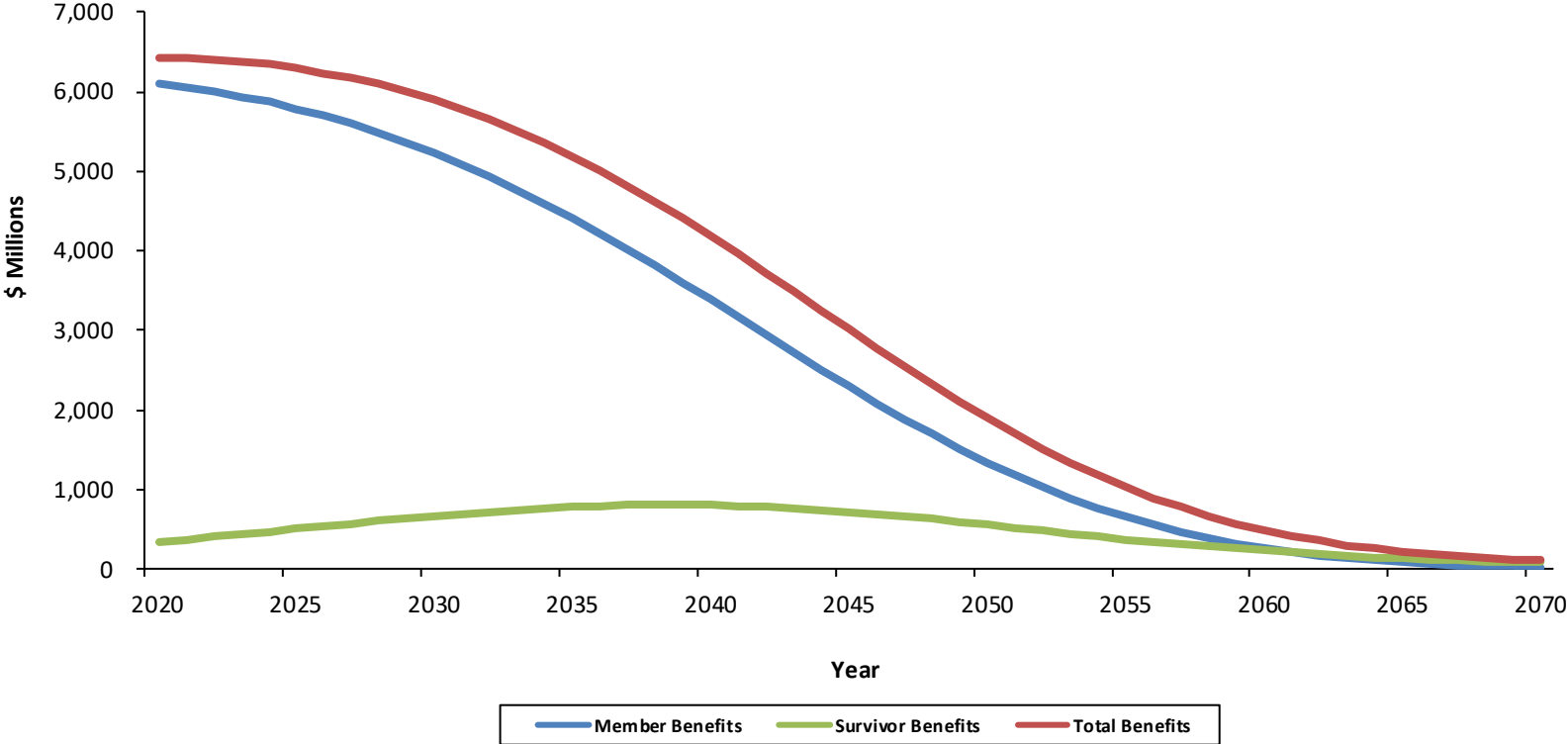
The charts above show the expected future development of the present population in simplified terms. The defined benefit portion of the Retirement System presently covers 278,609 active members. Eventually, 27% of the population is expected to terminate covered employment prior to retirement and forfeit 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. 8% 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, 2020



Projected Future Benefit Payments on Behalf of Present Retired Lives



Total future payments:	\$161.6 billion
From present assets:	\$ 71.8 billion
From future earnings:	\$ 89.8 billion

All Divisions

Defined Benefit Active Members in Valuation

December 31, 2020

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	3,573							3,573
Tot. Pay	\$36,813,339							\$36,813,339
Avg. Pay	\$10,303							\$10,303
20-24	18,797	161						18,958
Tot. Pay	\$400,296,261	\$5,711,657						\$406,007,918
Avg. Pay	\$21,296	\$35,476						\$21,416
25-29	20,305	4,236	88					24,629
Tot. Pay	\$765,093,837	\$204,832,843	\$4,027,385					\$973,954,065
Avg. Pay	\$37,680	\$48,355	\$45,766					\$39,545
30-34	15,124	9,946	2,408	127				27,605
Tot. Pay	\$630,068,782	\$537,717,379	\$140,542,079	\$6,664,192				\$1,314,992,432
Avg. Pay	\$41,660	\$54,064	\$58,365	\$52,474				\$47,636
35-39	11,046	7,927	6,122	2,618	178			27,891
Tot. Pay	\$467,302,297	\$437,375,738	\$381,346,005	\$165,153,529	\$9,931,036			\$1,461,108,605
Avg. Pay	\$42,305	\$55,175	\$62,291	\$63,084	\$55,792			\$52,386
40-44	9,329	6,025	5,159	6,024	3,057	105		29,699
Tot. Pay	\$388,767,259	\$329,628,778	\$321,238,536	\$404,109,886	\$202,590,455	\$6,525,952		\$1,652,860,866
Avg. Pay	\$41,673	\$54,710	\$62,268	\$67,083	\$66,271	\$62,152		\$55,654
45-49	8,060	5,131	4,271	4,884	6,704	2,409	101	31,560
Tot. Pay	\$327,779,161	\$277,986,825	\$263,112,991	\$326,385,036	\$467,858,043	\$168,296,081	\$6,515,748	\$1,837,933,885
Avg. Pay	\$40,667	\$54,178	\$61,605	\$66,827	\$69,788	\$69,861	\$64,512	\$58,236
50-54	7,330	5,045	4,282	4,681	6,177	6,416	2,188	36,119
Tot. Pay	\$286,151,033	\$258,628,999	\$249,031,278	\$297,769,131	\$418,390,333	\$476,204,824	\$157,545,274	\$2,143,720,872
Avg. Pay	\$39,038	\$51,264	\$58,158	\$63,612	\$67,734	\$74,221	\$72,004	\$59,352
55-59	5,928	4,193	3,971	4,488	5,452	5,060	4,212	33,304
Tot. Pay	\$219,663,873	\$208,726,663	\$217,131,381	\$264,861,408	\$340,446,665	\$347,569,171	\$314,824,997	\$1,913,224,158
Avg. Pay	\$37,055	\$49,780	\$54,679	\$59,015	\$62,444	\$68,690	\$74,745	\$57,447
60-64	4,524	3,379	3,266	4,093	4,670	3,994	3,160	27,086
Tot. Pay	\$141,733,527	\$157,012,367	\$166,534,719	\$225,267,361	\$281,145,600	\$257,850,372	\$230,261,531	\$1,459,805,477
Avg. Pay	\$31,329	\$46,467	\$50,990	\$55,037	\$60,202	\$64,559	\$72,868	\$53,895
65-69	2,714	1,532	1,369	1,644	1,682	1,341	1,422	11,704
Tot. Pay	\$59,438,919	\$60,348,933	\$66,528,827	\$85,347,755	\$94,682,768	\$80,967,869	\$99,639,446	\$546,954,517
Avg. Pay	\$21,901	\$39,392	\$48,597	\$51,915	\$56,292	\$60,379	\$70,070	\$46,732
70 & Over	2,501	999	676	684	578	448	595	6,481
Tot. Pay	\$36,716,546	\$21,173,316	\$20,960,447	\$26,931,601	\$25,099,456	\$22,861,645	\$36,823,426	\$190,566,437
Avg. Pay	\$14,681	\$21,195	\$31,007	\$39,374	\$43,425	\$51,030	\$61,888	\$29,404
Totals	109,231	48,574	31,612	29,243	28,498	19,773	11,678	278,609
Tot. Pay	\$3,759,824,834	\$2,499,143,498	\$1,830,453,648	\$1,802,489,899	\$1,840,144,356	\$1,360,275,914	\$845,610,422	\$13,937,942,571
Avg. Pay	\$34,421	\$51,450	\$57,904	\$61,638	\$64,571	\$68,795	\$72,411	\$50,027

All Divisions
Defined Benefit Active Members in Valuation
December 31, 2020
by Gender and Years of Service

Service Years	Active Member Count			Active Member Pays	
	Males	Females	Total	Total	Average
0	15,154	19,779	34,933	\$ 785,632,122	\$22,490
1	11,313	13,765	25,078	863,526,515	34,434
2	8,648	10,264	18,912	758,138,079	40,088
3	7,258	8,878	16,136	696,290,412	43,151
4	6,249	7,923	14,172	656,237,706	46,305
5	5,535	6,856	12,391	595,080,764	48,025
6	5,007	5,582	10,589	535,004,917	50,525
7	4,606	5,226	9,832	508,754,786	51,745
8	3,974	4,711	8,685	469,610,355	54,071
9	3,491	3,586	7,077	390,692,676	55,206
10	3,024	3,329	6,353	361,891,279	56,964
11	2,579	2,515	5,094	291,703,052	57,264
12	2,768	3,380	6,148	349,556,425	56,857
13	3,281	3,725	7,006	405,646,802	57,900
14	3,307	3,704	7,011	421,656,090	60,142
15 & Up	43,061	46,131	89,192	5,848,520,591	65,572
Totals	129,255	149,354	278,609	\$ 13,937,942,571	\$50,027

All Divisions
Defined Benefit Members in Valuation
December 31, 2020

Active & Inactive Members by Transition Group

	Traditional Plan	Combined Plan	Total
Active Counts			
Transition Group A	24,007	378	24,385
Transition Group B	34,960	686	35,646
Transition Group C	212,378	6,200	218,578
Total	271,345	7,264	278,609
Payroll			
Transition Group A	\$ 1,396,438,311	\$ 21,170,205	\$ 1,417,608,516
Transition Group B	2,196,267,045	43,418,888	2,239,685,933
Transition Group C	9,905,971,429	374,676,693	10,280,648,122
Total	\$ 13,498,676,785	\$ 439,265,786	\$ 13,937,942,571
Inactive Counts			
Transition Group A	5,893	40	5,933
Transition Group B	9,482	147	9,629
Transition Group C	632,594	2,168	634,762
Total	647,969	2,355	650,324

Retired Members by COLA Provision

	December 31, 2020	
	Number Receiving	Monthly Benefits
3% Fixed Simple COLA	152,691	\$ 379,525,824
CPI Indexed Simple COLA	66,807	156,370,558
No COLA (Money Purchase)	4,154	1,925,583
Total	223,652	\$ 537,821,965

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

	2020		2019	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
Beginning of Year				
1. Total Actuarial Accrued Liabilities	\$111,371.30	100.00 %	\$108,704.61	100.00 %
2. Valuation Assets	88,571.72	79.53 %	84,286.99	77.54 %
3. Unfunded Actuarial Accrued Liabilities	\$22,799.58	20.47 %	\$24,417.62	22.46 %
Experience Gains (Losses)				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$484.66	0.44 %	\$194.31	0.18 %
b. Investment return	2,560.05	2.30 %	1,576.17	1.45 %
c. Total	\$3,044.71	2.74 %	\$1,770.48	1.63 %
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$(53.90)	(0.05)%	\$16.84	0.02 %
b. Disability retirement	102.22	0.09 %	101.09	0.09 %
c. Death-in-service	37.90	0.03 %	35.78	0.03 %
d. Other separations	41.32	0.04 %	14.55	0.01 %
e. Total	\$127.54	0.11 %	\$168.26	0.15 %
6. Gains (losses) from retiree COLA experience	\$262.75	0.24 %	\$108.22	0.10 %
7. Gains (losses) from retiree mortality	\$231.37	0.21 %	\$12.24	0.01 %
8. Total experience gains (losses): (4c) + (5e) + (6) + (7)	\$3,666.37	3.30 %	\$2,059.20	1.89 %
End of Year				
9. Total Actuarial Accrued Liabilities	\$113,371.57	100.00 %	\$111,371.30	100.00 %
10. Valuation Assets	93,969.09	82.89 %	88,571.72	79.53 %
11. Unfunded Actuarial Accrued Liabilities	\$19,402.48	17.11 %	\$22,799.58	20.47 %

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

	2020		2019	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
Beginning of Year				
1. Total Actuarial Accrued Liabilities	\$110,887.29	100.00 %	\$108,264.57	100.00 %
2. Valuation Assets	87,902.87	79.27 %	83,715.40	77.32 %
3. Unfunded Actuarial Accrued Liabilities	\$22,984.42	20.73 %	\$24,549.17	22.68 %
Experience Gains (Losses)				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$476.71	0.43 %	\$189.67	0.18 %
b. Investment return	2,541.78	2.29 %	1,565.84	1.45 %
c. Total	\$3,018.49	2.72 %	\$1,755.51	1.63 %
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$(53.31)	(0.05)%	\$16.92	0.02 %
b. Disability retirement	96.29	0.09 %	95.20	0.09 %
c. Death-in-service	37.44	0.03 %	35.20	0.03 %
d. Other separations	41.45	0.04 %	14.08	0.01 %
e. Total	\$121.87	0.11 %	\$161.40	0.15 %
6. Gains (losses) from retiree COLA experience	\$262.11	0.24 %	\$107.95	0.10 %
7. Gains (losses) from retiree mortality	\$231.30	0.21 %	\$12.29	0.01 %
8. Total experience gains (losses): (4c) + (5e) + (6) + (7)	\$3,633.77	3.28 %	\$2,037.15	1.89 %
End of Year				
9. Total Actuarial Accrued Liabilities	\$112,832.54	100.00 %	\$110,887.29	100.00 %
10. Valuation Assets	93,180.16	82.58 %	87,902.87	79.27 %
11. Unfunded Actuarial Accrued Liabilities	\$19,652.38	17.42 %	\$22,984.42	20.73 %

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

	2020		2019	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
Beginning of Year				
1. Total Actuarial Accrued Liabilities	\$461.19	100.00 %	\$420.12	100.00 %
2. Valuation Assets	646.03	140.08 %	551.67	131.31 %
3. Unfunded Actuarial Accrued Liabilities	\$(184.84)	(40.08)%	\$(131.55)	(31.31)%
Experience Gains (Losses)				
4. Gains (losses) in economic risk areas				
a. Pay increases	\$7.95	1.72 %	\$4.64	1.11 %
b. Investment return	17.45	3.78 %	9.88	2.35 %
c. Total	\$25.40	5.50 %	\$14.52	3.46 %
5. Gains (losses) from active member decrement experience				
a. Service retirement	\$(0.58)	(0.13)%	\$(0.07)	(0.02)%
b. Disability retirement	5.93	1.29 %	5.89	1.40 %
c. Death-in-service	0.46	0.10 %	0.58	0.14 %
d. Other separations	(0.14)	(0.03)%	0.46	0.11 %
e. Total	\$5.67	1.23 %	\$6.86	1.63 %
6. Gains (losses) from retiree COLA experience	\$0.44	0.10 %	\$0.17	0.04 %
7. Gains (losses) from retiree mortality	\$(0.23)	(0.05)%	\$(0.17)	(0.04)%
8. Total experience gains (losses): (4c) + (5e) + (6) + (7)	\$31.28	6.78 %	\$21.38	5.09 %
End of Year				
9. Total Actuarial Accrued Liabilities	\$501.88	100.00 %	\$461.19	100.00 %
10. Valuation Assets	751.77	149.79 %	646.03	140.08 %
11. Unfunded Actuarial Accrued Liabilities	\$(249.89)	(49.79)%	\$(184.84)	(40.08)%

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

	2020		2019	
	Total \$	% of Accrued Liabilities	Total \$	% of Accrued Liabilities
Beginning of Year				
1. Total Actuarial Accrued Liabilities	\$22.82	100.00 %	\$19.92	100.00 %
2. Valuation Assets	22.82	100.00 %	19.92	100.00 %
3. Unfunded Actuarial Accrued Liabilities	\$0.00	0.00 %	\$0.00	0.00 %
Experience Gains (Losses)				
4. Gains (losses) in economic risk areas				
a. Pay increases				
b. Investment return	\$0.81	3.55 %	\$0.45	2.26 %
c. Total	\$0.81	3.55 %	\$0.45	2.26 %
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	\$0.20	0.88 %	\$0.09	0.45 %
7. Gains (losses) from retiree mortality	\$0.30	1.31 %	\$0.13	0.65 %
8. Total experience gains (losses): (4c) + (5e) + (6) + (7)	\$1.31	5.74 %	\$0.67	3.36 %
End of Year				
9. Total Actuarial Accrued Liabilities	\$37.15	100.00 %	\$22.82	100.00 %
10. Valuation Assets	37.15	100.00 %	22.82	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. Plans such as OPERS whose members are not in Social Security typically provide higher benefits than other plans, resulting in a larger asset base and hence increased investment risk.
- (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-21 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
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
2020	83	87	18	1.5	6.9	8.4	89

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
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
2020	150	157	0	-0.6	1.7	1.1	22

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
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
2020	100	105	N/A	0.0	0.1	0.1	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

FINANCIAL INFORMATION

Financial Data for Calendar Year 2020

Consolidated Asset Reconciliation

All Plans, All Divisions

	Traditional Pension Plan	DB Portion of Combined Pension Plan	DB Portion of Member-Directed Plan	2020 Total Defined Pension Benefit	Total Health Care	DC Portion of Combined Pension Plan	DC Portion of Member Directed	2020 Total Defined Contribution	Total 2020
Beginning Market Value @ 12/31/19									
Assets Held in Trust for Benefits	\$ 91,006,768,150	\$ 669,068,477	\$ 23,841,412	\$ 91,699,678,039	\$ 12,647,057,753	\$ 636,589,010	\$ 1,216,743,005	\$ 1,853,332,015	\$ 106,200,067,807
Gain/Loss on Security Lending Rounding (Prior Year File)	2,257,397	15,705	598	2,273,700	-	-	-	-	2,273,700
Assets Held for Upcoming Year Budget	112,583,998	-	-	112,583,998	-	-	-	-	112,583,998
Total Beginning Market Value @ 1/1/2020	91,121,609,718	669,083,950	23,842,012	91,814,535,680	12,647,057,751	636,589,237	1,216,743,003	1,853,332,240	106,314,925,671
External Cash Flows:									
Revenues:									
Member Contributions / Deposits	1,411,917,040	-	-	1,411,917,040	-	44,320,854	61,499,467	105,820,321	1,517,737,361
Employer Contributions	1,976,105,188	62,084,708	-	2,038,189,896	24,489,938	-	61,131,190	61,131,190	2,123,811,024
Employer Contributions - Administrative Expenses	-	-	369,511	369,511	-	-	-	-	369,511
Contract and Other Receipts	78,348,543	117,968	-	78,466,511	513,509	289,928	665,031	954,959	79,934,979
Refund from HC Vendors (Guarantees)	-	-	-	-	150,000	-	-	-	150,000
Other Income / Cancelled Warrants	906,079	-	-	906,079	280,729	-	-	-	1,186,808
Total Revenues	3,467,276,850	62,202,676	369,511	3,529,849,037	25,434,176	44,610,782	123,295,688	167,906,470	3,723,189,683
Disbursements:									
Refunds of Member Accounts	(420,286,261)	(3,755,507)	(791,037)	(424,832,805)	-	(11,915,199)	(46,680,547)	(58,595,746)	(483,428,551)
Retirement Benefits	(6,507,132,869)	(3,915,351)	(1,787,676)	(6,512,835,896)	-	(3,928,600)	(659,757)	(4,588,357)	(6,517,424,253)
Health Care Expenses	-	-	-	-	(546,912,424)	-	-	-	(546,912,424)
Retiree-Paid Health Care & Formulary Rebates	-	-	-	-	253,137,456	-	-	-	253,137,456
Federal Subsidies	-	-	-	-	253,409	-	-	-	253,409
ER Paid PCORI	-	-	-	-	(447,259)	-	-	-	(447,259)
ER Paid Medicare	-	-	-	-	(29,510,216)	-	-	-	(29,510,216)
Wellness RMA Claims	-	-	-	-	(100,665)	-	-	-	(100,665)
MD-RMA Claims	-	-	-	-	(3,802,370)	-	-	-	(3,802,370)
HRA Claims	-	-	-	-	(397,883,843)	-	-	-	(397,883,843)
Non-Investment Related Expenses	(51,327,751)	-	-	(51,327,751)	(16,194,820)	(2,781,210)	(2,652,969)	(5,434,179)	(72,956,750)
Investment Administrative Expense	(37,844,531)	-	-	(37,844,531)	(5,646,094)	(449,610)	(448,013)	(897,623)	(44,388,248)
Total Disbursements	(7,016,591,412)	(7,670,858)	(2,578,713)	(7,026,840,983)	(747,106,826)	(19,074,619)	(50,441,286)	(69,515,905)	(7,843,463,714)
Net External Cash Flow	(3,549,314,562)	54,531,818	(2,209,202)	(3,496,991,946)	(721,672,650)	25,536,163	72,854,402	98,390,565	(4,120,274,031)
Inter-Plan Activity									
Member Balance Transfers & Plan Switches	5,785,115	(2,377,287)	-	3,407,828	-	(1,147,903)	(2,259,925)	(3,407,828)	-
Mitigation Rate	37,064,392	(15,550,206)	(6,501,184)	15,013,002	-	-	(15,013,002)	(15,013,002)	-
Intraplan Transfer (DC to DB)	-	3,716,317	20,169,398	23,885,715	-	(3,716,317)	(20,169,398)	(23,885,715)	-
Total Inter-Plan Activity	42,849,507	(14,211,176)	13,668,214	42,306,545	-	(4,864,220)	(37,442,325)	(42,306,545)	-
Investment (Income) Loss:									
Gross Investment (Income) Loss	10,480,837,226	80,316,128	3,618,885	10,564,772,239	1,312,465,641	96,936,254	184,204,893	281,141,147	12,158,379,027
Unrealized (Income) Loss on Security Lending	236,050	3,403	262	239,715	12,692	-	-	-	252,407
External Asset Management Fees	(71,499,326)	(552,330)	(24,887)	(72,076,543)	(10,444,334)	(553,376)	(1,053,892)	(1,607,268)	(84,128,145)
Net Investment Income	10,409,573,950	79,767,201	3,594,260	10,492,935,411	1,302,033,999	96,382,878	183,151,001	279,533,879	12,074,503,289
Ending Market Value @ 12/31/20	98,024,718,613	789,171,793	38,895,284	98,852,785,690	13,227,419,100	753,644,058	1,435,306,081	2,188,950,139	114,269,154,929



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

Year Ended December 31	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	\$ 84,286,985,336	\$ 88,571,717,117			
B. Market Value End of Year	91,814,535,680	98,852,785,690			
C. Market Value Beginning of Year	81,427,366,061	91,814,535,680			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	1,410,501,971	1,411,917,040			
D2. Employer and other Non-Member Contributions	2,118,941,013	2,132,944,999			
D3. Refund of Member Accounts	(412,812,758)	(424,832,805)			
D4. Retirement Benefits	(6,315,710,358)	(6,512,835,896)			
D5. Member Balance Transfers / Intraplan Transfers / Other	7,637,776	27,293,543			
D6. Admin Expenses	(51,899,317)	(51,327,751)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,243,341,673)	(3,416,840,870)			
E. Investment Return					
E1. Market Total: B-C-D7	13,630,511,292	10,455,090,880			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	5,951,902,644	6,254,157,361			
E4. Amount Subject to Phase-In: E1-E3	7,678,608,648	4,200,933,519			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	1,919,652,162	1,050,233,380			
F2. First Prior Year	(2,106,306,648)	1,919,652,162	\$ 1,050,233,380		
F3. Second Prior Year	1,696,475,373	(2,106,306,648)	1,919,652,162	\$ 1,050,233,380	
F4. Third Prior Year	66,349,923	1,696,475,374	(2,106,306,649)	1,919,652,162	\$ 1,050,233,379
F5. Total Phase-Ins	1,576,170,810	2,560,054,268	863,578,893	2,969,885,542	1,050,233,379
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 88,571,717,117	\$ 93,969,087,876			
G2. Upper Corridor Limit: 112% x B	102,832,279,961	110,715,119,973			
G3. Lower Corridor Limit: 88% x B	80,796,791,399	86,990,451,407			
G4. Funding Value End of Year	\$ 88,571,717,117	\$ 93,969,087,876			
H. Difference Between Market and Funding Value	3,242,818,563	4,883,697,814	4,020,118,921	1,050,233,379	-
I. Recognized Rate of Return	9.11 %	10.15 %			
J. Market Rate of Return	17.08 %	11.60 %			
K. Ratio of Funding Value to Market Value	96 %	95 %			

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	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	\$ 83,715,397,357	\$ 87,902,862,816			
B. Market Value End of Year	91,121,609,718	98,024,718,613			
C. Market Value Beginning of Year	80,876,605,054	91,121,609,718			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	1,410,501,971	1,411,917,040			
D2. Employer and other Non-Member Contributions	2,066,634,038	2,092,424,202			
D3. Refund of Member Accounts	(407,308,374)	(420,286,261)			
D4. Retirement Benefits	(6,310,936,996)	(6,507,132,869)			
D5. Member Balance Transfers / Intraplan Transfers / Other	5,476,355	5,785,115			
D6. Admin Expenses	(51,899,317)	(51,327,751)			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	(3,287,532,323)	(3,468,620,524)			
E. Investment Return					
E1. Market Total: B-C-D7	13,532,536,987	10,371,729,419			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	5,909,157,446	6,204,135,783			
E4. Amount Subject to Phase-In: E1-E3	7,623,379,541	4,167,593,636			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	1,905,844,885	1,041,898,409			
F2. First Prior Year	(2,092,829,115)	1,905,844,885	\$ 1,041,898,409		
F3. Second Prior Year	1,686,870,476	(2,092,829,115)	1,905,844,885	\$ 1,041,898,409	
F4. Third Prior Year	65,954,090	1,686,870,477	(2,092,829,116)	1,905,844,886	\$ 1,041,898,409
F5. Total Phase-Ins	1,565,840,336	2,541,784,656	854,914,178	2,947,743,295	1,041,898,409
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 87,902,862,816	\$ 93,180,162,731			
G2. Upper Corridor Limit: 112% x B	102,056,202,884	109,787,684,847			
G3. Lower Corridor Limit: 88% x B	80,187,016,552	86,261,752,379			
G4. Funding Value End of Year	\$ 87,902,862,816	\$ 93,180,162,731			
H. Difference Between Market and Funding Value	3,218,746,902	4,844,555,882	3,989,641,704	1,041,898,409	-
I. Recognized Rate of Return	9.11 %	10.15 %			
J. Market Rate of Return	17.08 %	11.60 %			
K. Ratio of Funding Value to Market Value	96 %	95 %			

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	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	\$ 551,671,164	\$ 646,033,034			
B. Market Value End of Year	669,083,950	789,171,793			
C. Market Value Beginning of Year	531,500,579	669,083,950			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions	51,921,287	46,652,470			
D3. Refund of Member Accounts	(4,148,960)	(3,755,507)			
D4. Retirement Benefits	(3,184,930)	(3,915,351)			
D5. Member Balance Transfers / Intraplan Transfers / Other	(1,381,108)	1,339,030			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	43,206,289	40,320,642			
E. Investment Return					
E1. Market Total: B-C-D7	94,377,082	79,767,201			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	41,275,750	47,965,922			
E4. Amount Subject to Phase-In: E1-E3	53,101,332	31,801,279			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	13,275,333	7,950,320			
F2. First Prior Year	(13,004,257)	13,275,333	\$ 7,950,320		
F3. Second Prior Year	9,233,433	(13,004,257)	13,275,333	\$ 7,950,320	
F4. Third Prior Year	375,322	9,233,432	(13,004,258)	13,275,333	\$ 7,950,319
F5. Total Phase-Ins	9,879,831	17,454,828	8,221,395	21,225,653	7,950,319
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 646,033,034	\$ 751,774,426			
G2. Upper Corridor Limit: 112% x B	749,374,024	883,872,408			
G3. Lower Corridor Limit: 88% x B	588,793,876	694,471,178			
G4. Funding Value End of Year	\$ 646,033,034	\$ 751,774,426			
H. Difference Between Market and Funding Value	23,050,916	37,397,367	29,175,972	7,950,319	-
I. Recognized Rate of Return	8.92 %	9.82 %			
J. Market Rate of Return	17.06 %	11.57 %			
K. Ratio of Funding Value to Market Value	97 %	95 %			

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	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	\$ 19,916,815	\$ 22,821,267			
B. Market Value End of Year	23,842,012	38,895,284			
C. Market Value Beginning of Year	19,260,428	23,842,012			
D. Non-Investment Net Cash Flow					
D1. Member Contributions	-	-			
D2. Employer and other Non-Member Contributions	385,688	(6,131,673)			
D3. Refund of Member Accounts	(1,355,424)	(791,037)			
D4. Retirement Benefits	(1,588,432)	(1,787,676)			
D5. Member Balance Transfers / Intraplan Transfers / Other	3,542,529	20,169,398			
D6. Admin Expenses	-	-			
D7. Total Net Cash Flow: D1+D2+D3+D4+D5+D6	984,361	11,459,012			
E. Investment Return					
E1. Market Total: B-C-D7	3,597,223	3,594,260			
E2. Assumed Rate of Return	7.20%	7.20%			
E3. Assumed Amount of Return	1,469,448	2,055,656			
E4. Amount Subject to Phase-In: E1-E3	2,127,775	1,538,604			
F. Phased-In Recognition of Investment Return					
F1. Current Year: 0.25 x E4	531,944	384,651			
F2. First Prior Year	(473,276)	531,944	\$ 384,651		
F3. Second Prior Year	371,464	(473,276)	531,944	\$ 384,651	
F4. Third Prior Year	20,511	371,465	(473,275)	531,943	\$ 384,651
F5. Total Phase-Ins	450,643	814,784	443,320	916,594	384,651
G. Funding Value End of Year					
G1. Preliminary Funding Value End of Year: A+D7+E3+F5	\$ 22,821,267	\$ 37,150,719			
G2. Upper Corridor Limit: 112% x B	26,703,053	43,562,718			
G3. Lower Corridor Limit: 88% x B	20,980,971	34,227,850			
G4. Funding Value End of Year	\$ 22,821,267	\$ 37,150,719			
H. Difference Between Market and Funding Value	1,020,745	1,744,565	1,301,245	384,651	-
I. Recognized Rate of Return	9.41 %	10.05 %			
J. Market Rate of Return	18.21 %	12.15 %			
K. Ratio of Funding Value to Market Value	96 %	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, 2020

Traditional, Combined and Member Directed Plans

	Total DB System				
	State	Local	Public Safety	Law Enforcement	Total
(1) Employer Accumulation Fund					
(a) Allocated Amounts	\$ 4,986,833,998	\$ 10,008,275,223	\$ (15,425,979)	\$ 1,312,902,872	\$ 16,292,586,114
(b) Unallocated Amounts Allocated by (1)(a)	22,524,119	46,129,213	(74,323)	6,325,603	74,904,612
(c) OPERS Directed Asset Reallocation	0	0	0	0	0
(d) Total EAF (1)(a) + (1)(b) + (1)(c)	\$ 5,009,358,117	\$ 10,054,404,436	\$ (15,500,302)	\$ 1,319,228,475	\$ 16,367,490,726
(2) Employee Savings Fund (ESF)					
(a) Total Member Deposits	\$ 6,222,798,819	\$ 9,365,041,136	\$ 3,730,751	\$ 837,404,993	\$ 16,428,975,699
(b) ESF Allocated by (2)(a)	\$ 5,891,121,014	\$ 8,866,993,327	\$ 3,531,251	\$ 792,625,171	\$ 15,554,270,763
(3) Retired Assets					
(a) Allocated Amounts	\$ 26,675,874,063	\$ 37,334,126,440	\$ 48,720,817	\$ 2,688,149,368	\$ 66,746,870,688
(b) Additional Annuities and No Division	398,067	59,497,446	0	0	59,895,513
(c) Total Retiree Assets	\$ 26,676,272,130	\$ 37,393,623,886	\$ 48,720,817	\$ 2,688,149,368	\$ 66,806,766,201
(4) Subtotal: (1)(d) + (2)(b) + (3)(c)	\$ 37,576,751,261	\$ 56,315,021,649	\$ 36,751,766	\$ 4,800,003,014	\$ 98,728,527,690
(5) Assets Held for Upcoming Year Budget Allocated According to (4)	47,261,273	70,857,783	46,646	6,092,298	124,258,000
(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)	\$ 37,624,012,534	\$ 56,385,879,432	\$ 36,798,412	\$ 4,806,095,312	\$ 98,852,785,690
(7) Market Value Adjustment Allocated According to (6)	(1,858,715,037)	(2,785,638,358)	(1,818,643)	(237,525,776)	(4,883,697,814)
(8) Funding Value of Defined Benefit Assets (6)+(7)	\$ 35,765,297,497	\$ 53,600,241,074	\$ 34,979,769	\$ 4,568,569,536	\$ 93,969,087,876

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, 2020

Traditional Plan

	Traditional Plan				
	State	Local	Public Safety	Law Enforcement	Total
(1) Employer Accumulation Fund (EAF)					
(a) Allocated Amounts	\$ 4,669,684,720	\$ 9,566,694,616	\$ (15,425,979)	\$ 1,312,902,872	\$ 15,533,856,229
(b) Unallocated Amounts Allocated by (1)(a)	22,498,672	46,092,602	(74,323)	6,325,603	74,842,554
(c) OPERS Directed Asset Reallocation	0	0	0	0	0
(d) Total EAF (1)(a) + (1)(b) + (1)(c)	\$ 4,692,183,392	\$ 9,612,787,218	\$ (15,500,302)	\$ 1,319,228,475	\$ 15,608,698,783
(2) Employee Savings Fund (ESF)					
(a) Total Member Deposits	\$ 6,222,372,982	\$ 9,365,160,997	\$ 3,730,751	\$ 837,404,993	\$ 16,428,669,723
(b) ESF Allocated by (2)(a)	\$ 5,889,634,633	\$ 8,864,363,597	\$ 3,531,251	\$ 792,625,171	\$ 15,550,154,652
(3) Retired Assets					
(a) Allocated Amounts	\$ 26,654,021,659	\$ 37,290,819,821	\$ 48,720,817	\$ 2,688,149,368	\$ 66,681,711,665
(b) Additional Annuities	398,067	59,497,446	0	0	59,895,513
(c) Total Retiree Assets	\$ 26,654,419,726	\$ 37,350,317,267	\$ 48,720,817	\$ 2,688,149,368	\$ 66,741,607,178
(4) Subtotal: (1)(d) + (2)(b) + (3)(c)	\$ 37,236,237,751	\$ 55,827,468,082	\$ 36,751,766	\$ 4,800,003,014	\$ 97,900,460,613
(5) Assets Held for Upcoming Year Budget Allocated According to (4)	47,261,273	70,857,783	46,646	6,092,298	124,258,000
(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)	\$ 37,283,499,024	\$ 55,898,325,865	\$ 36,798,412	\$ 4,806,095,312	\$ 98,024,718,613
(7) Market Value Adjustment Allocated According to (6)	(1,842,616,812)	(2,762,594,651)	(1,818,643)	(237,525,776)	(4,844,555,882)
(8) Funding Value of Defined Benefit Assets (6)+(7)	\$ 35,440,882,212	\$ 53,135,731,214	\$ 34,979,769	\$ 4,568,569,536	\$ 93,180,162,731

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, 2020

Combined Plan

	Combined Plan				
	State	Local	Public Safety	Law Enforcement	Total
(1) Employer Accumulation Fund					
(a) Allocated Amounts	\$ 308,412,392	\$ 431,955,907	\$0	\$0	\$ 740,368,299
(b) Unallocated Amounts Allocated by (1)(a)	28,700	40,195	0	0	68,895
(c) OPERS Directed Asset Reallocation	0	0	0	0	0
(d) Total EAF (1)(a) + (1)(b) + (1)(c)	<u>\$ 308,441,092</u>	<u>\$ 431,996,102</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 740,437,194</u>
(2) Employee Savings Fund					
(a) Total Member Deposits	\$ 681,300	\$ 1,181,473	\$0	\$0	\$ 1,862,773
(b) ESF Allocated by (2)(a)	\$ 1,470,865	\$ 2,550,693	\$0	\$0	\$ 4,021,558
(3) Retired Assets					
(a) Allocated Amounts	\$ 15,585,105	\$ 29,127,936	\$0	\$0	\$ 44,713,041
(b) No Division	0	0	0	0	0
(c) Total Retiree Assets	<u>\$ 15,585,105</u>	<u>\$ 29,127,936</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 44,713,041</u>
(4) Subtotal: (1)(d) + (2)(b) + (3)(c)	<u>\$ 325,497,062</u>	<u>\$ 463,674,731</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 789,171,793</u>
(5) Assets Held for Upcoming Year Budget Allocated According to (4)	0	0	0	0	0
(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)	<u>\$ 325,497,062</u>	<u>\$ 463,674,731</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 789,171,793</u>
(7) Market Value Adjustment Allocated According to (6)	(15,424,694)	(21,972,673)	0	0	(37,397,367)
(8) Funding Value of Defined Benefit Assets (6)+(7)	<u>\$ 310,072,368</u>	<u>\$ 441,702,058</u>	<u>\$0</u>	<u>\$0</u>	<u>\$ 751,774,426</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, 2020

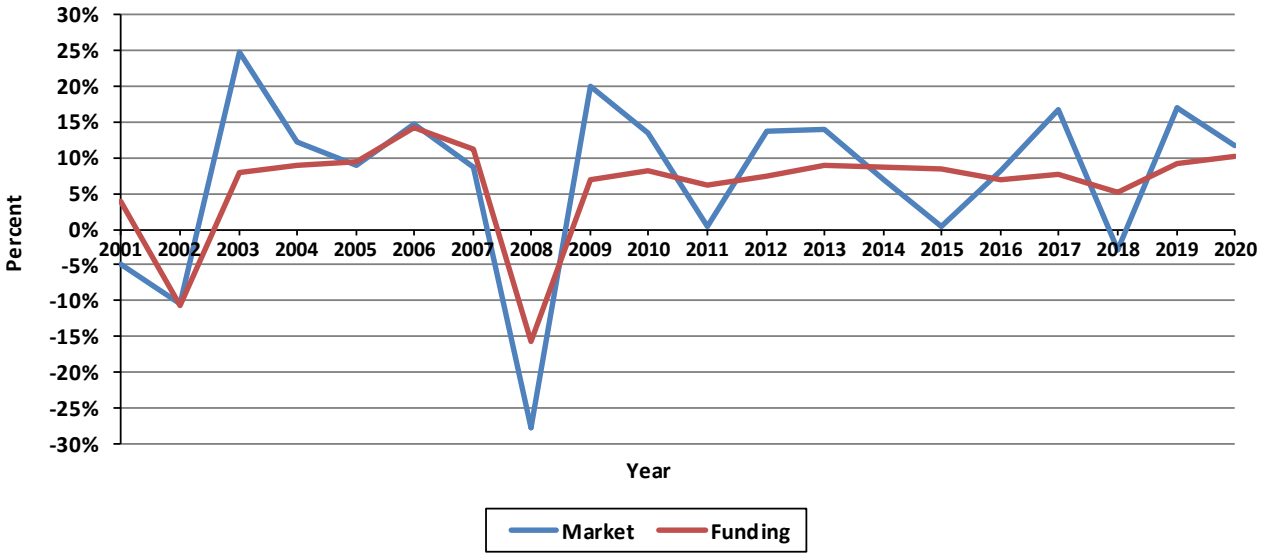
Member Directed Plan

	Member-Directed Plan				Total
	State	Local	Public Safety	Law Enforcement	
(1) Employer Accumulation Fund					
(a) Allocated Amounts	\$ 8,736,886	\$ 9,624,700	\$0	\$0	\$ 18,361,586
(b) Unallocated Amounts Allocated by 1(a)	(3,253)	(3,584)	0	0	(6,837)
(c) OPERS Directed Asset Reallocation	0	0	0	0	0
(d) Total EAF (1)(a) + (1)(b) + (1)(c)	\$ 8,733,633	\$ 9,621,116	\$0	\$0	\$ 18,354,749
(2) Employee Savings Fund					
(a) Total Member Deposits	\$ (255,463)	\$ (1,301,334)	\$0	\$0	\$ (1,556,797)
(b) ESF Allocated by (2)(a)	\$ 15,516	\$ 79,037	\$0	\$0	\$ 94,553
(3) Retired Assets					
(a) Allocated Amounts	\$ 6,267,299	\$ 14,178,683	\$0	\$0	\$ 20,445,982
(b) No Division	0	0	0	0	0
(c) Total Retiree Assets	\$ 6,267,299	\$ 14,178,683	\$0	\$0	\$ 20,445,982
(4) Subtotal: (1)(d) + (2)(b) + (3)(c)	\$ 15,016,448	\$ 23,878,836	\$0	\$0	\$ 38,895,284
(5) Assets Held for Upcoming Year Budget Allocated According to (4)	0	0	0	0	0
(6) Total Employer + Employee Defined Benefit Assets: (4)+(5)	\$ 15,016,448	\$ 23,878,836	\$0	\$0	\$ 38,895,284
(7) Market Value Adjustment Allocated According to (6)	(673,531)	(1,071,034)	0	0	(1,744,565)
(8) Funding Value of Defined Benefit Assets (6)+(7)	\$ 14,342,917	\$ 22,807,802	\$0	\$0	\$ 37,150,719

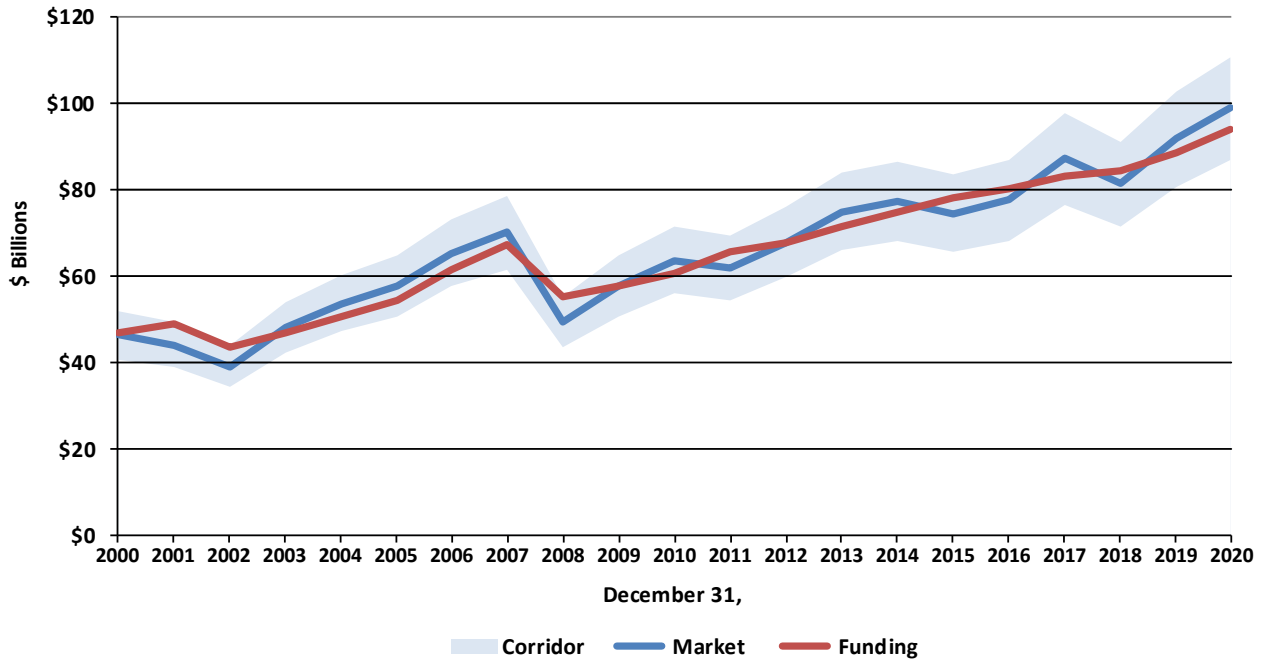
Amounts in rows 1b, 2b, and 5 were provided by OPERS in total and allocated to each division by the actuary.

Defined Benefit Pension Assets

Comparison of Rates of Return



Comparison of Asset Values



SECTION III

BENEFITS AND CONDITIONS EVALUATED

Benefits and Conditions Evaluated

Retirement 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 Transition Group C) 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

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.

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

Benefits and Conditions Evaluated

Key Terms

Final Average Salary (“FAS”) means the average of the annual earnings for the 3 highest calendar years of compensation (or the last 36 months of earnable salary) for Transition Group A and B members. The highest 5 calendar years (or the last 60 months of earnable salary) 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.

Traditional Pension Plan Contributions

Employer Contributions. Each employer contributes the remaining amounts necessary to finance OPERS benefits. Employer contributions are expressed as a percent 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). Retiree Health funding portion of the contribution rates are determined by Board adoption.

Member Contributions. Traditional Plan members contribute rates as a percent of earnable salary presented below.

Scheduled Contributions. The following table shows total scheduled employer contribution rates (including the allocation of the employer contribution rate between the pension and retiree health programs) and scheduled member contribution rates. Employer contribution rates for the State division have been adopted through July 1, 2023. Employer contribution rates for the Local Government, Law Enforcement and Public Safety divisions have been adopted through December 31, 2022.

For valuation purposes, it is assumed that the contribution rates as a percent of earnable salary presented below are applicable in calendar years 2021 and thereafter.

	State	Local Government	Law Enforcement	Public Safety
Employer Contributions				
-Pension	14.00%	14.00%	18.10%	18.10%
-Retiree Health	0.00%	0.00%	0.00%	0.00%
-Total	14.00%	14.00%	18.10%	18.10%
Member Contributions				
Total Contributions	24.00%	24.00%	31.10%	30.10%

Traditional Pension Plan Age & Service Benefits

Unreduced Age and service eligibility. The table below shows retirement eligibility conditions by division and transition group for unreduced age and service retirement.

Division	Group A		Group B		Group C	
	Age	Service	Age	Service	Age	Service
State and Local Government	Any	30	52	31	55	32
			Any	32		
	65	5	66	5	67	5
Law Enforcement	48	25	50	25	52	25
	62	15	64	15	64	15
Public Safety	52	25	54	25	56	25
	62	15	64	15	64	15
Law and Public Safety	52	25	54	25	56	25

Reduced Age and service eligibility. The table below shows retirement eligibility conditions by division and transition group for reduced age and service retirement.

Division	Group A		Group B		Group C	
	Age	Service	Age	Service	Age	Service
State and Local Government	55	25	55	25	57	25
	60	5	60	5	62	5
Law Enforcement	52	15	52	15	56	15
			48	25	48	25
Public Safety	52	15	52	15	56	15
	48	25	48	25	52	25
Law and Public Safety	48	25	48	25	52	25

Unreduced Age and service allowance – State and Local Government. A retiring member's age and service allowance is equal to Ohio service credit times 2.2% of FAS for the first 30 years of service (35 years for Transition Group C) plus 2.5% for years of service over 30 years (35 years for Transition Group C). Maximum allowance is 100% of FAS or the limits under IRC Section 415(b).

Traditional Pension Plan Age & Service Benefits (Continued)

Reduced Age and service allowance – State and Local Government. If a member retires before reaching age and service eligibility for an unreduced benefit, an early retirement reduction will be applied to the computed unreduced benefit. Below is a summary of the early retirement reduction factors:

Transition Group A		
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

* Whichever yields the higher percentage.

Transition Group B											
Service	Age										
	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

Transition Group C										
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

Traditional Pension Plan Age & Service Benefits (Continued)

Unreduced Age and service allowance – Law Members (Law Enforcement and Public Safety). A retiring member’s age and service allowance (if attained 25 years of service) is equal to 2.5% of FAS times the first 25 years of service plus 2.1% of FAS times service credit in excess of 25 years. A retiring member’s age and service allowance (if attained 15 years of service, but less than 25 years of service) is equal to 1.5% of FAS times years of service credit. Maximum allowance is 90% of FAS or the limits under IRC Section 415(b).

Reduced Age and service allowance – Law Members (Law Enforcement and Public Safety). If a member retires before reaching age and service eligibility for an unreduced benefit, an early retirement reduction will be applied to the computed unreduced benefit. Below is a summary of the early retirement reduction factors:

Transition Group A	
Public Safety	
Attained Age	Percentage of Base Amount
48	75%
49	80
50	86
51	93
52	100

Transition Group B			
Public Safety		Law Enforcement	
Attained Age	Percentage of Base Amount	Attained Age	Percentage of Base Amount
48	58%	48	84%
49	64	49	92
50	70	50	100
51	76		
52	83		
53	91		
54	100		

Transition Group C			
Public Safety		Law Enforcement	
Attained Age	Percentage of Base Amount	Attained Age	Percentage of Base Amount
52	69%	48	70%
53	76	49	76
54	83	50	84
55	91	51	91
56	100	52	100

Traditional Pension Plan 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 2.2% of FAS.
- 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 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 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

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:

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 Survivor Benefits (Continued)

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.

Traditional Pension Plan 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).

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).

Cost-of-Living Adjustment. A retiree who has received benefits for 12 months will receive an annual cost-of-living adjustment (COLA). The COLA is determined by the recipient's retirement effective date. Members with effective retirement dates prior to January 7, 2013 receive a simple 3 percent COLA corresponding to their base allowance. Members with effective retirement dates after January 7, 2013 receive a simple percent COLA corresponding to their base allowance equal to the percentage increase of the Consumer Price Index for the prior year (June to June CPI-W), not to exceed to 3 percent. Members who retired within the first five calendar years after January 7, 2013 received a simple 3 percent COLA until December 31, 2018. Reemployed Retiree annuitized balances do not receive a COLA.

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 Other Benefit Provisions

Refund of Member 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.

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.

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 required contributions) 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

Age and Service Eligibility. State and Local Government Members* who elected the Combined Plan may retire with an age and service retirement allowance under the same eligibility conditions as the Traditional Plan.

**Law Enforcement and Public Safety members must elect 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 (35 years for Transition Group C) plus 1.25% for years of service over 30 years (35 years for Transition Group C). Maximum allowance is 100% of FAS or the limits under IRC Section 415(b). Early retirement reduction factors for reduced benefits in the Combined Plan are the same as the Traditional Plan.

Age and Service 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.

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.

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).

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.



Combined Plan (Continued)

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.

Cost-of-Living Adjustment. A retiree who has received benefits for 12 months will receive an annual cost-of-living adjustment (COLA). The COLA is determined by the recipient's retirement effective date. Members with effective retirement dates prior to January 7, 2013 receive a simple 3 percent COLA corresponding to their base allowance. Members with effective retirement dates after January 7, 2013 receive a simple percent COLA corresponding to their base allowance equal to the percentage increase of the Consumer Price Index for the prior year (June to June CPI-W), not to exceed to 3 percent. Members who retired within the first five calendar years after January 7, 2013 received a simple 3 percent COLA until December 31, 2018. Reemployed Retiree annuitized balances do not receive a COLA.

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

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).

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 and Service Eligibility. State and Local Government Members* who elected the Member Directed Plan and attained age fifty-five (55) may retire under the Member-Directed Plan.

**Law Enforcement and Public Safety members must elect the Traditional Pension Plan only.*

Age and Service 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.

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.

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).

Member-Directed Plan (Continued)

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, 2020

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)
2021	\$ 19,921	\$ 19,921	\$ 23,520
2022	20,519	20,519	24,226
2023	21,116	21,116	24,931
2024	21,714	21,714	25,637
2025	22,312	22,312	26,342
2026	22,909	22,909	27,048
2027	23,507	23,507	27,754
2028	24,104	24,104	28,459
2029	24,702	24,702	29,165
2030	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, 2020.



Sample Benefit Computation – Traditional Plan State or Local Member (Transition Group A) - Early Retirement Retiring December 31, 2020 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)
2021	\$ 12,402	\$ 12,402	\$ 14,643
2022	12,774	12,774	15,082
2023	13,146	13,146	15,522
2024	13,518	13,518	15,961
2025	13,890	13,890	16,400
2026	14,263	14,263	16,840
2027	14,635	14,635	17,279
2028	15,007	15,007	17,718
2029	15,379	15,379	18,158
2030	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, 2020.



Sample Benefit Computation – Traditional Plan Public Safety Member (Transition Group A) - Normal Retirement Retiring December 31, 2020 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)
2021	\$ 18,810	\$ 18,810	\$ 20,915
2022	19,374	19,374	21,542
2023	19,939	19,939	22,170
2024	20,503	20,503	22,797
2025	21,067	21,067	23,425
2026	21,632	21,632	24,052
2027	22,196	22,196	24,680
2028	22,760	22,760	25,307
2029	23,324	23,324	25,935
2030	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, 2020.



Sample Benefit Computation – Traditional Plan Law Enforcement Member (Transition Group A) - Normal Retirement Retiring December 31, 2020 Under Benefit Provisions Evaluated

Data:

A.	\$38,000	Final Average Earnings
B.	28	Years of Credited Service
C.	49	Age of Retiree
D.	46	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:	$(0.025 \times 25 \text{ years} + 0.021 \times 3 \text{ years}) \times \$38,000 =$	\$ 26,144
G.	Reduction for Line E Election: # $(1 - 0.89936) \times (F) =$		2,631
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)
2021	\$ 23,513	\$ 23,513	\$ 26,144
2022	24,218	24,218	26,928
2023	24,924	24,924	27,713
2024	25,629	25,629	28,497
2025	26,335	26,335	29,281
2026	27,040	27,040	30,066
2027	27,745	27,745	30,850
2028	28,451	28,451	31,634
2029	29,156	29,156	32,419
2030	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, 2020.



Sample Benefit Computation – Traditional Plan

State or Local Member (Transition Group C) – Termination Benefit

Terminating December 31, 2020

Under Benefit Provisions Evaluated

Data:

A.	<u>\$32,000</u>	Final Average Earnings
B.	<u>15</u>	Years of Credited Service
C.	<u>45</u>	Age of Member
D.	<u>42</u>	Age of Spouse
E.	<u>62:59</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>\$44,000</u>	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: $\# (1 - 0.82672) \times (J) =$	<u>1,061</u>
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)
2038	\$ 5,064	\$ 5,064	\$ 6,125
2039	5,216	5,216	6,309
2040	5,368	5,368	6,492
2041	5,520	5,520	6,676
2042	5,671	5,671	6,860
2043	5,823	5,823	7,044
2044	5,975	5,975	7,227
2045	6,127	6,127	7,411
2046	6,279	6,279	7,595
2047	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, 2020.



Sample Benefit Computation – Traditional Plan Public Safety/Law Enforcement Member (Transition Group C) – Termination Benefit Terminating December 31, 2020 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)
2040	\$ 7,396	\$ 7,396	\$ 8,550
2041	7,618	7,618	8,807
2042	7,840	7,840	9,063
2043	8,062	8,062	9,320
2044	8,284	8,284	9,576
2045	8,505	8,505	9,833
2046	8,727	8,727	10,089
2047	8,949	8,949	10,346
2048	9,171	9,171	10,602
2049	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, 2020.



SECTION IV

RECOMMENDATIONS FOR RESERVE TRANSFERS

December 31, 2020 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 do 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, 2020

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
State						
A&PR Fund						
SR	\$ 22,981,968,544	\$ 0	\$ 1,823,934,717	\$ 24,805,903,261	\$ 24,805,903,261	
MP	51,751,619	0	5,429,709	57,181,328	57,181,328	
AA	398,067	0	(65,469)	332,598	332,598	
JR	0	0	0	0	0	
CR	188,318,287	0	23,203,948	211,522,235	211,522,235	
DR	2,065,757,713	0	119,033,625	2,184,791,338	2,184,791,338	
BD	653,737,467	46,023	15,367,020	669,150,510	669,150,510	
Total A&PR	\$ 25,941,931,697	\$ 46,023	\$ 1,986,903,550	\$ 27,928,881,270	\$ 27,928,881,270	100.0%
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	141,191,825	111,919	14,429,109	155,732,853	155,732,853	
S-2	571,296,204	157,698	45,510,570	616,964,472	616,964,472	
Total SBF	\$ 712,488,029	\$ 269,617	\$ 59,939,679	\$ 772,697,325	\$ 772,697,325	100.0%
Total State	\$ 26,654,419,726	\$ 315,640	\$ 2,046,843,229	\$ 28,701,578,595	\$ 28,701,578,595	100.0%
Local						
A&PR Fund						
SR	\$ 32,463,706,602	\$ 0	\$ 2,440,337,765	\$ 34,904,044,367	\$ 34,904,044,367	
MP	128,893,843	0	14,400,209	143,294,052	143,294,052	
AA	59,497,446	0	4,720,002	64,217,448	64,217,448	
JR	129	0	(129)	0	0	
CR	265,149,448	0	40,691,407	305,840,855	305,840,855	
DR	2,507,786,543	6,138	139,811,853	2,647,604,534	2,647,604,534	
BD	766,397,099	38,078	4,943,845	771,379,022	771,379,022	
Total A&PR	\$ 36,191,431,110	\$ 44,216	\$ 2,644,904,952	\$ 38,836,380,278	\$ 38,836,380,278	100.0%
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	211,618,286	201,857	19,245,340	231,065,483	231,065,483	
S-2	947,267,871	209,586	68,539,558	1,016,017,015	1,016,017,015	
Total SBF	\$ 1,158,886,157	\$ 411,443	\$ 87,784,898	\$ 1,247,082,498	\$ 1,247,082,498	100.0%
Total Local	\$ 37,350,317,267	\$ 455,659	\$ 2,732,689,850	\$ 40,083,462,776	\$ 40,083,462,776	100.0%

Traditional Plan

Reserve Transfers Affecting the Employer Accumulation Fund

December 31, 2020

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
Public Safety						
A&PR Fund						
SR	\$ 9,285,718	\$ 0	\$ 2,414,271	\$ 11,699,989	\$ 11,699,989	
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	14,392,974	0	1,340,188	15,733,162	15,733,162	
BD	2,089,174	0	(104,240)	1,984,934	1,984,934	
Total A&PR	\$ 25,767,866	\$ 0	\$ 3,650,219	\$ 29,418,085	\$ 29,418,085	100.0%
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	3,676,946	23,356	1,691,864	5,392,166	5,392,166	
S-2	19,276,005	0	1,715,532	20,991,537	20,991,537	
Total SBF	\$ 22,952,951	\$ 23,356	\$ 3,407,396	\$ 26,383,703	\$ 26,383,703	100.0%
Total Public Safety	\$ 48,720,817	\$ 23,356	\$ 7,057,615	\$ 55,801,788	\$ 55,801,788	100.0%
Law Enforcement						
A&PR Fund						
SR	\$ 1,902,039,155	\$ 0	\$ 145,667,305	\$ 2,047,706,460	\$ 2,047,706,460	
MP	0	0	33,414	33,414	33,414	
AA	0	0	0	0	0	
JR	0	0	0	0	0	
CR	1,382,354	0	342,274	1,724,628	1,724,628	
DR	551,145,926	0	40,563,263	591,709,189	591,709,189	
BD	169,557,933	18,567	15,834,744	185,411,244	185,411,244	
Total A&PR	\$ 2,624,125,368	\$ 18,567	\$ 202,441,000	\$ 2,826,584,935	\$ 2,826,584,935	100.0%
SBF						
AA	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
S-1	10,761,921	1,824	1,147,171	11,910,916	11,910,916	
S-2	53,262,079	30,116	4,649,952	57,942,147	57,942,147	
Total SBF	\$ 64,024,000	\$ 31,940	\$ 5,797,123	\$ 69,853,063	\$ 69,853,063	100.0%
Total Law Enforcement	\$ 2,688,149,368	\$ 50,507	\$ 208,238,123	\$ 2,896,437,998	\$ 2,896,437,998	100.0%
Grand Total	\$ 66,741,607,178	\$ 845,162	\$ 4,994,828,817	\$ 71,737,281,157	\$ 71,737,281,157	100.0%

Combined Plan
Reserve Transfers Affecting the Employer Accumulation Fund
December 31, 2020

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
State						
A&PR Fund						
CA	\$ 6,230,652	\$ 0	\$ (380,332)	\$ 5,850,320	\$ 5,850,320	
CA Reserve for Future Adverse Experience	0	0	380,332	380,332	380,332	
CA Total (DC)	\$ 6,230,652	\$ 0	\$ 0	\$ 6,230,652	\$ 6,230,652	
CB Total (DB)	9,354,453	0	397,114	9,751,567	9,751,567	
Total A&PR	\$ 15,585,105	\$ 0	\$ 397,114	\$ 15,982,219	\$ 15,982,219	100.0%
Total State	\$ 15,585,105	\$ 0	\$ 397,114	\$ 15,982,219	\$ 15,982,219	100.0%
Local						
A&PR Fund						
CA	\$ 10,986,469	\$ 0	\$ (988,792)	\$ 9,997,677	\$ 9,997,677	
CA Reserve for Future Adverse Experience	0	0	988,792	988,792	988,792	
CA Total (DC)	\$ 10,986,469	\$ 0	\$ 0	\$ 10,986,469	\$ 10,986,469	
CB Total (DB)	18,141,467	0	(1,261,303)	16,880,164	16,880,164	
Total A&PR	\$ 29,127,936	\$ 0	\$ (1,261,303)	\$ 27,866,633	\$ 27,866,633	100.0%
Total Local	\$ 29,127,936	\$ 0	\$ (1,261,303)	\$ 27,866,633	\$ 27,866,633	100.0%
Grand Total	\$ 44,713,041	\$ 0	\$ (864,189)	\$ 43,848,852	\$ 43,848,852	100.0%

Member Directed Plan
Reserve Transfers Affecting the Employer Accumulation Fund
December 31, 2020

	Assets Before Transfers	Transfers		Assets After Transfers	Liabilities	Ratio
		Accrued	Other			
State						
A&PR Fund						
MD	\$ 6,267,299	\$ 0	\$ 184,239	\$ 6,451,538	\$ 6,451,538	
Reserve for Future Adverse Experience*	8,075,618	0	(184,239)	7,891,379	7,891,379	
Total State	\$ 14,342,917	\$ 0	\$ 0	\$ 14,342,917	\$ 14,342,917	100.0%
Local						
A&PR Fund						
MD	\$ 14,178,683	\$ 0	\$ 36,072	\$ 14,214,755	\$ 14,214,755	
Reserve for Future Adverse Experience*	8,629,119	0	(36,072)	8,593,047	8,593,047	
Total Local	\$ 22,807,802	\$ 0	\$ 0	\$ 22,807,802	\$ 22,807,802	100.0%
Grand Total	\$ 37,150,719	\$ 0	\$ 0	\$ 37,150,719	\$ 37,150,719	100.0%

* Includes funds for pending retirements.

SECTION V

STATE DIVISION

STATE 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, 2020

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Traditional Plan					
Men	41,433	\$ 2,378,601,247	\$ 57,408	42.6 yrs.	11.1 yrs.
Women	53,633	2,853,770,259	53,209	41.7	9.9
Traditional Plan Total	95,066	\$ 5,232,371,506	\$ 55,039	42.1 yrs.	10.4 yrs.
Combined Plan					
Men	1,039	\$ 72,947,749	\$ 70,210	45.5 yrs.	10.4 yrs.
Women	1,639	110,724,563	67,556	45.1	9.6
Combined Plan Total	2,678	\$ 183,672,312	\$ 68,586	45.3 yrs.	9.9 yrs.
Grand Total	97,744	\$ 5,416,043,818	\$ 55,410	42.2 yrs.	10.4 yrs.

Also included in the valuation were 304,462 inactive members and 3,879 members active in the money purchase plan.

Retired Members in Valuation December 31, 2020

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
Traditional Plan			
A & PR Fund			
Superannuation Retirement	62,974	\$ 187,049,485	\$ 25,017,758,094
Disability Retirement	7,500	21,089,866	2,853,941,848
Money Purchase	1,071	566,716	57,181,328
Total A & PR Fund	71,545	\$ 208,706,067	\$ 27,928,881,270
Total SBF	4,459	6,325,763	772,697,325
Traditional Plan Total	76,004	\$ 215,031,830	\$ 28,701,578,595
Combined Plan			
A & PR Fund			
CB (DB)	135	\$ 69,735	\$ 9,751,567
CA (DC)	96	41,890	6,230,652
Total A & PR Fund	231	\$ 111,625	\$ 15,982,219
Combined Plan Total	231	\$ 111,625	\$ 15,982,219
Member Directed Plan			
A & PR Fund	90	\$ 45,931	\$ 6,451,538
Reserve for Future Adverse Experience			7,891,379
Member Directed Plan Total	90	\$ 45,931	\$ 14,342,917
Grand Total	76,325	\$ 215,189,386	\$ 28,731,903,731

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

Valuation Date December 31	2020			2019
Contributions for	2023			2022
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*	8.15 %	4.59 %	8.03 %	8.16 %
Disability Allowances	1.78 %	1.65 %	1.78 %	1.69 %
Survivor's Benefits	0.33 %	0.28 %	0.33 %	0.34 %
Separation Benefits	4.26 %	0.97 %	4.14 %	4.16 %
Total Normal Cost	14.52 %	7.49 %	14.28 %	14.35 %
(Member Contributions)	10.00 %	0.00 %	9.61 %	9.61 %
Employer Normal Cost	4.52 %	7.49 %	4.67 %	4.74 %
Unfunded Actuarial Accrued Liabilities				
Total Available Contribution	9.48 %	6.51 %	9.33 %	9.26 %
Amortization Years	24	0	24	29
Total Pension Employer Contribution Rate	14.00 %	14.00 %	14.00 %	14.00 %

* 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					
2006	2009	115,930	(\$Millions) \$ 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 %
2020	2023	97,744	5,416	55,410	6.4 %	4.67 %	9.33 %	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, 2020

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	\$ 27,959,206,406	\$ -	\$ 27,959,206,406
Allowances currently being paid from the Survivors Benefit Fund	772,697,325	-	772,697,325
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	17,374,484,889	3,649,708,088	13,724,776,801
Disability allowances likely to be paid present active members who become permanently disabled	1,831,346,600	809,959,326	1,021,387,274
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	429,597,924	141,073,756	288,524,168
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,905,183,387	1,951,512,770	953,670,617
Total	\$ 51,272,516,531	\$ 6,552,253,940	\$ 44,720,262,591
Funding Value of Assets			35,765,297,497
Unfunded Actuarial Accrued Liability			\$ 8,954,965,094

* 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 Total	Valuation Assets	Unfunded	Amortization Years	
	Total	Average					
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
2020	5,416	55,410	15,997	7,042	8,955	24	1.65

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, 2020
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	376							376
Tot. Pay	\$3,904,122							\$3,904,122
Avg. Pay	\$10,383							\$10,383
20-24	4,385	17						4,402
Tot. Pay	\$83,984,808	\$805,135						\$84,789,943
Avg. Pay	\$19,153	\$47,361						\$19,262
25-29	3,828	706	6					4,540
Tot. Pay	\$145,504,704	\$36,729,073	\$340,634					\$182,574,411
Avg. Pay	\$38,011	\$52,024	\$56,772					\$40,215
30-34	2,547	1,612	435	8				4,602
Tot. Pay	\$115,197,563	\$94,243,715	\$27,753,540	\$480,140				\$237,674,958
Avg. Pay	\$45,229	\$58,464	\$63,801	\$60,018				\$51,646
35-39	1,619	1,262	1,147	439	22			4,489
Tot. Pay	\$79,745,415	\$78,182,856	\$78,594,062	\$30,361,285	\$1,489,213			\$268,372,831
Avg. Pay	\$49,256	\$61,952	\$68,521	\$69,160	\$67,692			\$59,785
40-44	1,164	929	919	939	442	3		4,396
Tot. Pay	\$59,670,954	\$57,650,223	\$65,691,621	\$70,226,794	\$32,229,674	\$165,041		\$285,634,307
Avg. Pay	\$51,264	\$62,056	\$71,482	\$74,789	\$72,918	\$55,014		\$64,976
45-49	888	727	691	771	1,076	342	7	4,502
Tot. Pay	\$44,315,422	\$45,463,017	\$47,717,036	\$58,610,666	\$82,470,353	\$26,841,149	\$450,343	\$305,867,986
Avg. Pay	\$49,905	\$62,535	\$69,055	\$76,019	\$76,645	\$78,483	\$64,335	\$67,940
50-54	770	651	647	682	993	1,214	348	5,305
Tot. Pay	\$39,847,747	\$42,186,644	\$45,051,297	\$52,425,408	\$73,840,189	\$101,449,297	\$29,353,666	\$384,154,248
Avg. Pay	\$51,750	\$64,803	\$69,631	\$76,870	\$74,361	\$83,566	\$84,350	\$72,414
55-59	563	486	558	622	750	894	816	4,689
Tot. Pay	\$26,890,200	\$30,357,226	\$37,949,945	\$45,125,420	\$53,889,582	\$70,975,562	\$69,519,265	\$334,707,200
Avg. Pay	\$47,762	\$62,463	\$68,011	\$72,549	\$71,853	\$79,391	\$85,195	\$71,381
60-64	384	353	377	480	593	569	603	3,359
Tot. Pay	\$16,593,839	\$22,079,552	\$26,013,343	\$34,273,103	\$42,782,671	\$44,869,726	\$51,044,213	\$237,656,447
Avg. Pay	\$43,213	\$62,548	\$69,001	\$71,402	\$72,146	\$78,857	\$84,650	\$70,752
65-69	174	147	171	210	188	190	283	1,363
Tot. Pay	\$7,305,431	\$9,296,676	\$11,509,439	\$15,812,823	\$14,603,450	\$15,263,487	\$23,406,689	\$97,197,995
Avg. Pay	\$41,985	\$63,243	\$67,307	\$75,299	\$77,678	\$80,334	\$82,709	\$71,312
70 & Over	94	52	45	56	55	62	85	449
Tot. Pay	\$2,613,743	\$2,896,600	\$2,790,448	\$4,313,001	\$3,988,256	\$4,716,506	\$7,695,994	\$29,014,548
Avg. Pay	\$27,806	\$55,704	\$62,010	\$77,018	\$72,514	\$76,073	\$90,541	\$64,620
Totals	16,792	6,942	4,996	4,207	4,119	3,274	2,142	42,472
Tot. Pay	\$625,573,948	\$419,890,717	\$343,411,365	\$311,628,640	\$305,293,388	\$264,280,768	\$181,470,170	\$2,451,548,996
Avg. Pay	\$37,254	\$60,486	\$68,737	\$74,074	\$74,118	\$80,721	\$84,720	\$57,722

STATE DIVISION
Female Active Members in Defined Benefit Valuation
December 31, 2020
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	777							777
Tot. Pay	\$7,037,690							\$7,037,690
Avg. Pay	\$9,058							\$9,058
20-24	6,592	13						6,605
Tot. Pay	\$118,226,955	\$468,531						\$118,695,486
Avg. Pay	\$17,935	\$36,041						\$17,971
25-29	5,071	889	3					5,963
Tot. Pay	\$199,305,134	\$45,385,221	\$153,989					\$244,844,344
Avg. Pay	\$39,303	\$51,052	\$51,330					\$41,061
30-34	3,401	2,179	498	10				6,088
Tot. Pay	\$150,226,229	\$127,690,344	\$31,752,664	\$659,715				\$310,328,952
Avg. Pay	\$44,171	\$58,600	\$63,760	\$65,972				\$50,974
35-39	2,252	1,661	1,310	469	16			5,708
Tot. Pay	\$106,984,676	\$99,770,164	\$88,747,311	\$32,220,596	\$830,152			\$328,552,899
Avg. Pay	\$47,507	\$60,066	\$67,746	\$68,701	\$51,885			\$57,560
40-44	1,863	1,203	1,055	1,156	456	12		5,745
Tot. Pay	\$89,940,308	\$72,068,608	\$71,595,719	\$86,336,285	\$32,654,954	\$993,949		\$353,589,823
Avg. Pay	\$48,277	\$59,907	\$67,863	\$74,685	\$71,612	\$82,829		\$61,547
45-49	1,520	1,052	869	855	1,047	340	13	5,696
Tot. Pay	\$74,046,923	\$66,514,414	\$61,916,484	\$64,914,518	\$78,833,328	\$25,572,140	\$1,047,186	\$372,844,993
Avg. Pay	\$48,715	\$63,227	\$71,250	\$75,923	\$75,294	\$75,212	\$80,553	\$65,457
50-54	1,261	924	839	829	994	1,182	408	6,437
Tot. Pay	\$61,379,415	\$55,275,191	\$58,224,307	\$60,557,986	\$72,502,334	\$92,962,666	\$31,895,390	\$432,797,289
Avg. Pay	\$48,675	\$59,822	\$69,397	\$73,049	\$72,940	\$78,649	\$78,175	\$67,236
55-59	835	764	800	822	894	924	863	5,902
Tot. Pay	\$40,570,957	\$46,484,723	\$51,423,819	\$55,789,203	\$59,226,077	\$69,242,336	\$69,352,012	\$392,089,127
Avg. Pay	\$48,588	\$60,844	\$64,280	\$67,870	\$66,248	\$74,938	\$80,362	\$66,433
60-64	511	476	640	752	786	732	580	4,477
Tot. Pay	\$22,623,547	\$29,849,318	\$39,949,562	\$48,097,356	\$52,612,363	\$50,915,649	\$44,513,218	\$288,561,013
Avg. Pay	\$44,273	\$62,709	\$62,421	\$63,959	\$66,937	\$69,557	\$76,747	\$64,454
65-69	132	154	215	263	274	201	214	1,453
Tot. Pay	\$4,737,577	\$9,151,982	\$13,651,062	\$16,655,606	\$17,700,974	\$14,297,468	\$15,846,845	\$92,041,514
Avg. Pay	\$35,891	\$59,428	\$63,493	\$63,329	\$64,602	\$71,132	\$74,051	\$63,346
70 & Over	51	41	44	71	72	58	84	421
Tot. Pay	\$1,400,929	\$1,636,735	\$2,475,905	\$4,106,778	\$4,000,067	\$3,687,677	\$5,803,601	\$23,111,692
Avg. Pay	\$27,469	\$39,920	\$56,271	\$57,842	\$55,556	\$63,581	\$69,090	\$54,897
Totals	24,266	9,356	6,273	5,227	4,539	3,449	2,162	55,272
Tot. Pay	\$876,480,340	\$554,295,231	\$419,890,822	\$369,338,043	\$318,360,249	\$257,671,885	\$168,458,252	\$2,964,494,822
Avg. Pay	\$36,120	\$59,245	\$66,936	\$70,660	\$70,139	\$74,709	\$77,918	\$53,635

STATE DIVISION
Inactive Members in Defined Benefit Valuation
December 31, 2020
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	517							517
20-24	34,512	2						34,514
25-29	52,909	219	1					53,129
30-34	67,885	1,023	57	2				68,967
35-39	39,581	1,344	292	38				41,255
40-44	32,439	1,140	465	131	21			34,196
45-49	23,732	917	436	193	61	8		25,347
50-54	14,828	1,053	535	245	151	46	3	16,861
55-59	9,674	1,111	741	372	208	67	7	12,180
60-64	7,749	914	618	318	132	35	8	9,774
65-69	4,834	352	168	85	33	11	6	5,489
70 & Over	2,054	101	36	20	9	6	7	2,233
Totals	290,714	8,176	3,349	1,404	615	173	31	304,462

SECTION VI

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.

Active Members in Valuation December 31, 2020

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Traditional Plan					
Men	77,684	\$ 3,734,819,185	\$ 48,077	47.1 yrs.	11.1 yrs.
Women	90,535	3,950,684,978	43,637	46.2	11.0
Traditional Plan Total	168,219	\$ 7,685,504,163	\$ 45,687	46.6 yrs.	11.0 yrs.
Combined Plan					
Men	2,038	\$ 120,981,078	\$ 59,363	47.8 yrs.	10.2 yrs.
Women	2,548	134,612,396	52,831	46.9	10.0
Combined Plan Total	4,586	\$ 255,593,474	\$ 55,733	47.3 yrs.	10.1 yrs.
Grand Total	172,805	\$ 7,941,097,637	\$ 45,954	46.6 yrs.	11.0 yrs.

Also included in the valuation were 352,667 inactive members and 15,711 members active in the money purchase plan.

Retired Members in Valuation December 31, 2020

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
Traditional Plan			
A & PR Fund			
Superannuation Retirement	117,791	\$ 264,829,136	\$ 35,274,102,670
Disability Retirement	10,173	25,816,767	3,418,983,556
Money Purchase	3,468	1,411,264	143,294,052
Total A & PR Fund	131,432	\$ 292,057,167	\$ 38,836,380,278
Total SBF	9,436	10,312,777	1,247,082,498
Traditional Plan Total	140,868	\$ 302,369,944	\$ 40,083,462,776
Combined Plan			
A & PR Fund			
CB (DB)	295	\$ 119,977	\$ 16,880,164
CA (DC)	218	70,982	10,986,469
Total A & PR Fund	513	\$ 190,959	\$ 27,866,633
Combined Plan Total	513	\$ 190,959	\$ 27,866,633
Member Directed Plan			
A & PR Fund			
Reserve for Future Adverse Experience	241	\$ 101,295	\$ 14,214,755
Member Directed Plan Total	241	\$ 101,295	\$ 22,807,802
Grand Total	141,622	\$ 302,662,198	\$ 40,134,137,211

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

Valuation Date December 31	2020			2019
Contributions for	2023			2022
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*	8.65 %	4.85 %	8.52 %	8.62 %
Disability Allowances	1.45 %	1.32 %	1.45 %	1.38 %
Survivor's Benefits	0.42 %	0.35 %	0.42 %	0.42 %
Separation Benefits	3.87 %	1.05 %	3.77 %	3.79 %
Total Normal Cost	14.39 %	7.57 %	14.16 %	14.21 %
(Member Contributions)	10.00 %	0.00 %	9.64 %	9.63 %
Employer Normal Cost	4.39 %	7.57 %	4.52 %	4.58 %
Unfunded Actuarial Accrued Liabilities				
Total Available Contribution	9.61 %	6.43 %	9.48 %	9.42 %
Amortization Years	15	0	15	20
Total Pension Employer Contribution Rate	14.00 %	14.00 %	14.00 %	14.00 %

* 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)							
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 %
2020	2023	172,805	7,941	45,954	4.3 %	4.52 %	9.48 %	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, 2020

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	\$ 38,887,054,713	\$ -	\$ 38,887,054,713
Allowances currently being paid from the Survivors Benefit Fund	1,247,082,498	-	1,247,082,498
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	25,823,974,114	5,687,919,114	20,136,055,000
Disability allowances likely to be paid present active members who become permanently disabled	2,049,447,813	968,445,521	1,081,002,292
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	751,008,529	259,624,626	491,383,903
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	4,258,626,619	2,639,382,514	1,619,244,105
Total	\$ 73,017,194,286	\$ 9,555,371,775	\$ 63,461,822,511
Funding Value of Assets			53,600,241,074
Unfunded Actuarial Accrued Liability			\$ 9,861,581,437

* 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	
	Total	Average	Total	Assets		Years	
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
2020	7,941	45,954	23,338	13,476	9,862	15	1.24

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, 2020
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	1,178							1,178
Tot. Pay	\$13,374,727							\$13,374,727
Avg. Pay	\$11,354							\$11,354
20-24	3,818	67						3,885
Tot. Pay	\$98,842,362	\$2,735,811						\$101,578,173
Avg. Pay	\$25,889	\$40,833						\$26,146
25-29	4,556	1,174	33					5,763
Tot. Pay	\$165,521,755	\$54,812,689	\$1,714,913					\$222,049,357
Avg. Pay	\$36,330	\$46,689	\$51,967					\$38,530
30-34	3,808	2,440	669	50				6,967
Tot. Pay	\$154,946,826	\$127,181,707	\$37,827,424	\$2,853,407				\$322,809,364
Avg. Pay	\$40,690	\$52,124	\$56,543	\$57,068				\$46,334
35-39	3,079	2,137	1,494	762	65			7,537
Tot. Pay	\$123,939,091	\$115,820,308	\$88,762,048	\$47,075,579	\$3,720,592			\$379,317,618
Avg. Pay	\$40,253	\$54,198	\$59,412	\$61,779	\$57,240			\$50,327
40-44	2,602	1,691	1,379	1,533	871	45		8,121
Tot. Pay	\$103,161,278	\$90,756,248	\$81,458,923	\$99,205,222	\$56,523,613	\$2,864,116		\$433,969,400
Avg. Pay	\$39,647	\$53,670	\$59,071	\$64,713	\$64,895	\$63,647		\$53,438
45-49	2,386	1,526	1,172	1,389	1,666	672	29	8,840
Tot. Pay	\$91,090,876	\$78,709,066	\$68,938,629	\$89,771,954	\$116,625,090	\$46,697,851	\$2,015,869	\$493,849,335
Avg. Pay	\$38,177	\$51,579	\$58,821	\$64,631	\$70,003	\$69,491	\$69,513	\$55,865
50-54	2,188	1,472	1,263	1,382	1,770	1,640	598	10,313
Tot. Pay	\$78,193,788	\$73,234,284	\$69,467,174	\$85,740,739	\$123,925,055	\$118,997,190	\$43,227,461	\$592,785,691
Avg. Pay	\$35,738	\$49,752	\$55,002	\$62,041	\$70,014	\$72,559	\$72,287	\$57,479
55-59	2,056	1,286	1,128	1,327	1,634	1,524	1,181	10,136
Tot. Pay	\$73,341,533	\$62,828,272	\$60,324,336	\$76,071,177	\$105,224,491	\$103,888,805	\$87,797,056	\$569,475,670
Avg. Pay	\$35,672	\$48,856	\$53,479	\$57,326	\$64,397	\$68,169	\$74,341	\$56,183
60-64	1,772	1,173	1,014	1,207	1,375	1,175	1,017	8,733
Tot. Pay	\$50,283,535	\$50,771,844	\$48,875,330	\$64,504,517	\$86,831,544	\$76,314,075	\$73,913,775	\$451,494,620
Avg. Pay	\$28,377	\$43,284	\$48,201	\$53,442	\$63,150	\$64,948	\$72,678	\$51,700
65-69	1,481	708	504	549	532	429	511	4,714
Tot. Pay	\$28,821,007	\$24,725,574	\$22,603,337	\$25,806,433	\$29,895,694	\$24,939,482	\$35,739,638	\$192,531,165
Avg. Pay	\$19,461	\$34,923	\$44,848	\$47,006	\$56,195	\$58,134	\$69,941	\$40,842
70 & Over	1,549	642	403	334	224	163	220	3,535
Tot. Pay	\$21,735,636	\$11,574,516	\$10,760,261	\$10,567,633	\$8,304,957	\$7,243,879	\$12,378,261	\$82,565,143
Avg. Pay	\$14,032	\$18,029	\$26,700	\$31,640	\$37,076	\$44,441	\$56,265	\$23,356
Totals	30,473	14,316	9,059	8,533	8,137	5,648	3,556	79,722
Tot. Pay	\$1,003,252,414	\$693,150,319	\$490,732,375	\$501,596,661	\$531,051,036	\$380,945,398	\$255,072,060	\$3,855,800,263
Avg. Pay	\$32,923	\$48,418	\$54,171	\$58,783	\$65,264	\$67,448	\$71,730	\$48,366



LOCAL GOVERNMENT DIVISION
Female Active Members in Defined Benefit Valuation
December 31, 2020
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	1,242							1,242
Tot. Pay	\$12,496,800							\$12,496,800
Avg. Pay	\$10,062							\$10,062
20-24	3,739	63						3,802
Tot. Pay	\$86,629,355	\$1,657,088						\$88,286,443
Avg. Pay	\$23,169	\$26,303						\$23,221
25-29	6,222	1,183	44					7,449
Tot. Pay	\$219,776,788	\$49,138,920	\$1,640,218					\$270,555,926
Avg. Pay	\$35,323	\$41,538	\$37,278					\$36,321
30-34	5,018	3,071	628	55				8,772
Tot. Pay	\$189,375,523	\$144,428,410	\$30,398,848	\$2,400,282				\$366,603,063
Avg. Pay	\$37,739	\$47,030	\$48,406	\$43,641				\$41,792
35-39	3,950	2,549	1,782	751	68			9,100
Tot. Pay	\$148,294,066	\$121,421,883	\$95,418,374	\$40,372,820	\$3,393,459			\$408,900,602
Avg. Pay	\$37,543	\$47,635	\$53,546	\$53,759	\$49,904			\$44,934
40-44	3,620	2,050	1,581	1,942	977	39		10,209
Tot. Pay	\$131,339,778	\$98,550,905	\$85,982,460	\$112,787,993	\$55,965,216	\$2,096,205		\$486,722,557
Avg. Pay	\$36,282	\$48,074	\$54,385	\$58,078	\$57,283	\$53,749		\$47,676
45-49	3,191	1,738	1,403	1,600	2,249	771	48	11,000
Tot. Pay	\$114,107,261	\$81,341,408	\$74,811,681	\$92,213,304	\$135,970,306	\$45,895,569	\$2,636,925	\$546,976,454
Avg. Pay	\$35,759	\$46,802	\$53,323	\$57,633	\$60,458	\$59,527	\$54,936	\$49,725
50-54	3,080	1,962	1,467	1,642	2,086	1,866	739	12,842
Tot. Pay	\$105,184,013	\$85,394,553	\$71,581,095	\$88,085,574	\$121,568,575	\$120,091,637	\$44,483,908	\$636,389,355
Avg. Pay	\$34,151	\$43,524	\$48,794	\$53,645	\$58,278	\$64,358	\$60,195	\$49,555
55-59	2,459	1,642	1,459	1,663	2,045	1,579	1,278	12,125
Tot. Pay	\$78,060,364	\$68,139,330	\$65,712,949	\$84,032,390	\$112,231,834	\$92,562,686	\$81,790,047	\$582,529,600
Avg. Pay	\$31,745	\$41,498	\$45,040	\$50,531	\$54,881	\$58,621	\$63,998	\$48,044
60-64	1,856	1,369	1,223	1,636	1,888	1,463	910	10,345
Tot. Pay	\$52,200,606	\$53,902,535	\$50,867,837	\$77,101,247	\$96,835,334	\$81,286,892	\$56,482,664	\$468,677,115
Avg. Pay	\$28,125	\$39,374	\$41,593	\$47,128	\$51,290	\$55,562	\$62,069	\$45,305
65-69	926	522	475	618	678	513	398	4,130
Tot. Pay	\$18,512,964	\$17,093,926	\$18,560,586	\$26,766,864	\$31,667,753	\$25,931,167	\$23,327,133	\$161,860,393
Avg. Pay	\$19,992	\$32,747	\$39,075	\$43,312	\$46,708	\$50,548	\$58,611	\$39,191
70 & Over	807	261	184	222	224	165	204	2,067
Tot. Pay	\$10,966,238	\$4,897,297	\$4,933,833	\$7,873,477	\$8,638,607	\$7,213,583	\$10,776,031	\$55,299,066
Avg. Pay	\$13,589	\$18,764	\$26,814	\$35,466	\$38,565	\$43,719	\$52,824	\$26,753
Totals	36,110	16,410	10,246	10,129	10,215	6,396	3,577	93,083
Tot. Pay	\$1,166,943,756	\$725,966,255	\$499,907,881	\$531,633,951	\$566,271,084	\$375,077,739	\$219,496,708	\$4,085,297,374
Avg. Pay	\$32,316	\$44,239	\$48,791	\$52,486	\$55,435	\$58,643	\$61,363	\$43,889

LOCAL GOVERNMENT DIVISION
Inactive Members in Defined Benefit Valuation
December 31, 2020
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	4,352							4,352
20-24	37,357	9						37,366
25-29	40,999	358	1					41,358
30-34	46,013	1,247	113					47,373
35-39	42,098	1,680	478	78				44,334
40-44	38,577	1,659	729	320	38			41,323
45-49	31,730	1,743	837	448	192	28		34,978
50-54	25,702	2,023	1,125	606	350	119	6	29,931
55-59	21,050	2,191	1,401	745	452	130	16	25,985
60-64	19,771	2,030	1,352	719	403	77	24	24,376
65-69	13,443	963	458	187	98	30	11	15,190
70 & Over	5,471	361	133	71	42	16	7	6,101
Totals	326,563	14,264	6,627	3,174	1,575	400	64	352,667

SECTION VII

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, 2020

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	43	\$ 2,258,898	\$ 52,533	40.9 yrs.	11.5 yrs.
Women	12	590,173	49,181	37.9	7.3
Totals	55	\$ 2,849,071	\$ 51,801	40.3 yrs.	10.6 yrs.

Also included in the valuation were 58 inactive members and 0 members active in the money purchase plan.

Retired Members in Valuation December 31, 2020

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	34	\$ 75,820	\$ 11,699,989
Disability Retirement	34	124,312	17,718,096
Money Purchase	0	0	0
Total A & PR Fund	68	\$ 200,132	\$ 29,418,085
Total SBF	125	193,622	26,383,703
Grand Total	193	\$ 393,754	\$ 55,801,788

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

Valuation Date December 31	2020	2019
Contributions for	2023	2022
Normal Cost		
Age and Service Allowances*	9.35 %	9.59 %
Disability Allowances	3.39 %	3.27 %
Survivor's Benefits	0.42 %	0.49 %
Separation Benefits	5.21 %	5.23 %
Total Normal Cost	18.37 %	18.58 %
(Member Contributions)	12.00 %	12.00 %
Employer Normal Cost	6.37 %	6.58 %
Unfunded Actuarial Accrued Liabilities		
Total Available Contribution	11.73 %	11.52 %
Amortization Years	N/A	N/A
Total Pension Employer Contribution Rate	18.10 %	18.10 %

* 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)							
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 %
2020	2023	55	2,849	51,801	(0.1)%	6.37 %	11.73 %	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, 2020

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	\$ 29,418,085	\$ -	\$ 29,418,085
Allowances currently being paid from the Survivors Benefit Fund	26,383,703	-	26,383,703
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	8,554,069	2,167,423	6,386,646
Disability allowances likely to be paid present active members who become permanently disabled	1,780,595	785,029	995,566
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	222,688	88,957	133,731
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	2,167,721	1,245,232	922,489
Total	\$ 68,526,861	\$ 4,286,641	\$ 64,240,220
Funding Value of Assets			34,979,769
Unfunded Actuarial Accrued Liability			\$ 29,260,451

* 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	
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
2020	3	51,801	8	(21)	29	N/A	9.67

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, 2020
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	\$105,427							\$105,427
Avg. Pay	\$52,714							\$52,714
25-29	8							8
Tot. Pay	\$430,059							\$430,059
Avg. Pay	\$53,757							\$53,757
30-34	4	4						8
Tot. Pay	\$151,693	\$243,703						\$395,396
Avg. Pay	\$37,923	\$60,926						\$49,425
35-39	1		1					2
Tot. Pay	\$55,727		\$41,030					\$96,757
Avg. Pay	\$55,727		\$41,030					\$48,379
40-44		1		2				3
Tot. Pay		\$39,656		\$124,545				\$164,201
Avg. Pay		\$39,656		\$62,273				\$54,734
45-49	1		2	2	6			11
Tot. Pay	\$35,179		\$82,754	\$103,413	\$342,838			\$564,184
Avg. Pay	\$35,179		\$41,377	\$51,707	\$57,140			\$51,289
50-54				1		1	1	3
Tot. Pay				\$45,682		\$46,354	\$69,332	\$161,368
Avg. Pay				\$45,682		\$46,354	\$69,332	\$53,789
55-59				2	1	1		4
Tot. Pay				\$120,740	\$69,079	\$39,726		\$229,545
Avg. Pay				\$60,370	\$69,079	\$39,726		\$57,386
60-64		1						1
Tot. Pay		\$39,816						\$39,816
Avg. Pay		\$39,816						\$39,816
65-69			1					1
Tot. Pay			\$72,145					\$72,145
Avg. Pay			\$72,145					\$72,145
70 & Over								
Tot. Pay								
Avg. Pay								
Totals	16	6	4	7	7	2	1	43
Tot. Pay	\$778,085	\$323,175	\$195,929	\$394,380	\$411,917	\$86,080	\$69,332	\$2,258,898
Avg. Pay	\$48,630	\$53,863	\$48,982	\$56,340	\$58,845	\$43,040	\$69,332	\$52,533



PUBLIC SAFETY DIVISION
Female Active Members in Valuation December 31, 2020
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	\$104,631							\$104,631
Avg. Pay	\$52,316							\$52,316
25-29	3							3
Tot. Pay	\$151,627							\$151,627
Avg. Pay	\$50,542							\$50,542
30-34	1							1
Tot. Pay	\$36,203							\$36,203
Avg. Pay	\$36,203							\$36,203
35-39		1		1				2
Tot. Pay		\$44,712		\$41,505				\$86,217
Avg. Pay		\$44,712		\$41,505				\$43,109
40-44								
Tot. Pay								
Avg. Pay								
45-49		1						1
Tot. Pay		\$42,778						\$42,778
Avg. Pay		\$42,778						\$42,778
50-54						1		1
Tot. Pay						\$96,878		\$96,878
Avg. Pay						\$96,878		\$96,878
55-59								
Tot. Pay								
Avg. Pay								
60-64		1						1
Tot. Pay		\$40,180						\$40,180
Avg. Pay		\$40,180						\$40,180
65-69			1					1
Tot. Pay			\$31,659					\$31,659
Avg. Pay			\$31,659					\$31,659
70 & Over								
Tot. Pay								
Avg. Pay								
Totals	6	3	1	1		1		12
Tot. Pay	\$292,461	\$127,670	\$31,659	\$41,505		\$96,878		\$590,173
Avg. Pay	\$48,744	\$42,557	\$31,659	\$41,505		\$96,878		\$49,181

PUBLIC SAFETY DIVISION
Inactive Members in Valuation December 31, 2020
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	7	1	1					9
40-44	10	1		1				12
45-49	6							6
50-54	2							2
55-59			1					1
60-64	1							1
65-69								
70 & Over								
Totals	51	4	2	1				58

SECTION VIII

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, 2020

Groups	Number	Annual Payroll	Average		
			Pay	Age	Service
Men	7,018	\$ 510,472,878	\$ 72,738	41.6 yrs.	14.7 yrs.
Women	987	67,479,167	68,368	40.4	13.6
Totals	8,005	\$ 577,952,045	\$ 72,199	41.5 yrs.	14.6 yrs.

Also included in the valuation were 1,361 inactive members and 26 members active in the money purchase plan.

Retired Members in Valuation December 31, 2020

Fund/Type of Allowance	Number	Current Monthly Benefits	Actuarial Liabilities
A & PR Fund			
Superannuation Retirement	3,516	\$ 13,477,715	\$ 2,049,431,088
Disability Retirement	1,577	5,549,835	777,120,433
Money Purchase	3	230	33,414
Total A & PR Fund	5,096	\$ 19,027,780	\$ 2,826,584,935
Total SBF	416	548,847	69,853,063
Grand Total	5,512	\$ 19,576,627	\$ 2,896,437,998

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

Valuation Date December 31	2020	2019
Contributions for	2023	2022
Normal Cost		
Age and Service Allowances*	14.25 %	14.43 %
Disability Allowances	3.68 %	3.51 %
Survivor's Benefits	0.49 %	0.50 %
Separation Benefits	2.61 %	2.61 %
Total Normal Cost	21.03 %	21.05 %
(Member Contributions)	13.00 %	13.00 %
Employer Normal Cost	8.03 %	8.05 %
Unfunded Actuarial Accrued Liabilities		
Total Available Contribution	10.07 %	10.05 %
Amortization Years	10	16
Total Pension Employer Contribution Rate	18.10 %	18.10 %

**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)							
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 %
2020	2023	8,005	577,952	72,199	3.2 %	8.03 %	10.07 %	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, 2020

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	\$ 2,826,584,935	\$ -	\$ 2,826,584,935
Allowances currently being paid from the Survivors Benefit Fund	69,853,063	-	69,853,063
Age and service allowances based on service rendered before and likely to be rendered after valuation date*	2,724,354,254	786,135,717	1,938,218,537
Disability allowances likely to be paid present active members who become permanently disabled	413,030,556	202,298,441	210,732,115
Survivor benefits likely to be paid to spouses and children of present active members who die before retiring	59,259,722	25,206,080	34,053,642
Separation benefits (refunds of contributions and deferred allowances) likely to be paid to present active and inactive members	190,296,703	144,494,737	45,801,966
Total	\$ 6,283,379,233	\$ 1,158,134,975	\$ 5,125,244,258
Funding Value of Assets			4,568,569,536
Unfunded Actuarial Accrued Liability			\$ 556,674,722

* 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 and Inactive Member Accrued Liabilities for Retirement Allowances				Unfunded /Payroll
	Active Payroll		Computed Total	Valuation Assets	Unfunded	Amortization Years	
	Total	Average					
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
2020	578	72,199	2,229	1,672	557	10	0.96

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, 2020
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								210
Avg. Pay								\$9,990,870
20-24	209	1						210
Tot. Pay	\$9,945,778	\$45,092						\$9,990,870
Avg. Pay	\$47,587	\$45,092						\$47,576
25-29	516	246	2					764
Tot. Pay	\$28,881,990	\$16,501,525	\$177,631					\$45,561,146
Avg. Pay	\$55,973	\$67,079	\$88,816					\$59,635
30-34	309	557	155	4				1,025
Tot. Pay	\$18,083,508	\$38,311,444	\$11,185,152	\$270,648				\$67,850,752
Avg. Pay	\$58,523	\$68,782	\$72,162	\$67,662				\$66,196
35-39	126	289	332	173	6			926
Tot. Pay	\$7,136,528	\$20,444,335	\$25,368,901	\$13,362,287	\$417,252			\$66,729,303
Avg. Pay	\$56,639	\$70,742	\$76,412	\$77,239	\$69,542			\$72,062
40-44	69	132	200	395	276	6		1,078
Tot. Pay	\$3,847,097	\$9,313,239	\$14,762,740	\$31,119,596	\$22,511,198	\$406,641		\$81,960,511
Avg. Pay	\$55,755	\$70,555	\$73,814	\$78,784	\$81,562	\$67,774		\$76,030
45-49	67	70	115	241	587	256	4	1,340
Tot. Pay	\$3,760,496	\$4,880,812	\$8,248,289	\$18,863,662	\$47,976,727	\$21,212,768	\$365,425	\$105,308,179
Avg. Pay	\$56,127	\$69,726	\$71,724	\$78,272	\$81,732	\$82,862	\$91,356	\$78,588
50-54	29	31	61	127	296	458	88	1,090
Tot. Pay	\$1,390,476	\$2,187,950	\$4,384,255	\$9,624,067	\$23,772,908	\$38,274,998	\$7,949,743	\$87,584,397
Avg. Pay	\$47,947	\$70,579	\$71,873	\$75,780	\$80,314	\$83,570	\$90,338	\$80,353
55-59	14	14	23	45	110	118	67	391
Tot. Pay	\$726,977	\$829,192	\$1,540,752	\$3,268,548	\$8,485,985	\$9,552,241	\$5,844,864	\$30,248,559
Avg. Pay	\$51,927	\$59,228	\$66,989	\$72,634	\$77,145	\$80,951	\$87,237	\$77,362
60-64	1	5	10	14	24	49	46	149
Tot. Pay	\$32,000	\$276,119	\$722,959	\$1,048,276	\$1,855,609	\$3,883,527	\$4,035,331	\$11,853,821
Avg. Pay	\$32,000	\$55,224	\$72,296	\$74,877	\$77,317	\$79,256	\$87,725	\$79,556
65-69	1	1	2	3	8	7	14	36
Tot. Pay	\$61,940	\$80,775	\$100,599	\$246,156	\$669,800	\$464,403	\$1,185,679	\$2,809,352
Avg. Pay	\$61,940	\$80,775	\$50,300	\$82,052	\$83,725	\$66,343	\$84,691	\$78,038
70 & Over		3		1	3		2	9
Tot. Pay		\$168,168		\$70,712	\$167,569		\$169,539	\$575,988
Avg. Pay		\$56,056		\$70,712	\$55,856		\$84,770	\$63,999
Totals	1,341	1,349	900	1,003	1,310	894	221	7,018
Tot. Pay	\$73,866,790	\$93,038,651	\$66,491,278	\$77,873,952	\$105,857,048	\$73,794,578	\$19,550,581	\$510,472,878
Avg. Pay	\$55,083	\$68,969	\$73,879	\$77,641	\$80,807	\$82,544	\$88,464	\$72,738



LAW ENFORCEMENT DIVISION

Female Active Members in Valuation December 31, 2020 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	50							50
Tot. Pay	\$2,456,945							\$2,456,945
Avg. Pay	\$49,139							\$49,139
25-29	101	38						139
Tot. Pay	\$5,521,780	\$2,265,415						\$7,787,195
Avg. Pay	\$54,671	\$59,616						\$56,023
30-34	36	83	23					142
Tot. Pay	\$2,051,237	\$5,618,056	\$1,624,451					\$9,293,744
Avg. Pay	\$56,979	\$67,687	\$70,628					\$65,449
35-39	19	28	56	23	1			127
Tot. Pay	\$1,146,794	\$1,691,480	\$4,414,279	\$1,719,457	\$80,368			\$9,052,378
Avg. Pay	\$60,358	\$60,410	\$78,826	\$74,759	\$80,368			\$71,279
40-44	11	19	25	57	35			147
Tot. Pay	\$807,844	\$1,249,899	\$1,747,073	\$4,309,451	\$2,705,800			\$10,820,067
Avg. Pay	\$73,440	\$65,784	\$69,883	\$75,604	\$77,309			\$73,606
45-49	7	17	19	26	73	28		170
Tot. Pay	\$423,004	\$1,035,330	\$1,398,118	\$1,907,519	\$5,639,401	\$2,076,604		\$12,479,976
Avg. Pay	\$60,429	\$60,902	\$73,585	\$73,366	\$77,252	\$74,164		\$73,412
50-54	2	5	5	18	38	54	6	128
Tot. Pay	\$155,594	\$350,377	\$323,150	\$1,289,675	\$2,781,272	\$4,285,804	\$565,774	\$9,751,646
Avg. Pay	\$77,797	\$70,075	\$64,630	\$71,649	\$73,191	\$79,367	\$94,296	\$76,185
55-59	1	1	3	7	18	20	7	57
Tot. Pay	\$73,842	\$87,920	\$179,580	\$453,930	\$1,319,617	\$1,307,815	\$521,753	\$3,944,457
Avg. Pay	\$73,842	\$87,920	\$59,860	\$64,847	\$73,312	\$65,391	\$74,536	\$69,201
60-64		1	2	4	4	6	4	21
Tot. Pay		\$53,003	\$105,688	\$242,862	\$228,079	\$580,503	\$272,330	\$1,482,465
Avg. Pay		\$53,003	\$52,844	\$60,716	\$57,020	\$96,751	\$68,083	\$70,594
65-69				1	2	1	2	6
Tot. Pay				\$59,873	\$145,097	\$71,862	\$133,462	\$410,294
Avg. Pay				\$59,873	\$72,549	\$71,862	\$66,731	\$68,382
70 & Over								
Tot. Pay								
Avg. Pay								
Totals	227	192	133	136	171	109	19	987
Tot. Pay	\$12,637,040	\$12,351,480	\$9,792,339	\$9,982,767	\$12,899,634	\$8,322,588	\$1,493,319	\$67,479,167
Avg. Pay	\$55,670	\$64,331	\$73,627	\$73,403	\$75,436	\$76,354	\$78,596	\$68,368

LAW ENFORCEMENT DIVISION
Inactive Members in Valuation December 31, 2020
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	38							38
25-29	138	10						148
30-34	167	63	3					233
35-39	116	46	21					183
40-44	96	23	25	22	2			168
45-49	96	26	21	26	23	3		195
50-54	117	21	19	11	17	6	1	192
55-59	63	7	18	12	4	3	2	109
60-64	29	6	3	5	4	1	2	50
65-69	22	2	2				2	28
70 & Over	15			1			1	17
Totals	897	204	112	77	50	13	8	1,361

SECTION IX

ALLOWANCES BEING PAID TO RETIREES AND BENEFICIARIES

Monthly Allowances of Retired Lives by Year of Retirement as of December 31, 2020

Year of Retirement	No.	Initial	Post-Ret. Increase	Total	Average
2020	9,366	\$23,031,478	\$ 20,429	\$ 23,051,907	\$ 2,461
2019	8,052	18,756,246	274,097	19,030,343	2,363
2018	8,165	17,662,006	788,564	18,450,570	2,260
2017	9,088	20,263,879	1,527,195	21,791,074	2,398
2016	8,184	17,444,185	1,852,195	19,296,380	2,358
2015	7,350	15,072,996	2,055,938	17,128,934	2,330
2014	11,621	21,159,194	3,480,246	24,639,440	2,120
2013	11,452	22,541,899	4,769,646	27,311,545	2,385
2012	10,501	21,700,226	5,250,153	26,950,379	2,566
2011	11,494	25,713,578	7,008,162	32,721,740	2,847
2010	10,236	21,062,350	6,366,219	27,428,569	2,680
2009	10,023	21,148,644	6,986,610	28,135,254	2,807
2008	8,638	16,670,248	6,005,029	22,675,277	2,625
2007	8,212	15,251,479	5,960,045	21,211,524	2,583
2006	8,588	15,203,392	6,379,443	21,582,835	2,513
2005	7,921	14,450,922	6,493,568	20,944,490	2,644
2004	7,325	12,607,515	6,035,663	18,643,178	2,545
1999-2003	30,609	49,379,150	27,380,573	76,759,723	2,508
1994-1998	18,334	23,068,305	15,353,865	38,422,170	2,096
1989-1993	9,944	10,351,415	8,465,278	18,816,693	1,892
1984-1988	5,575	4,810,884	4,619,203	9,430,087	1,691
1979-1983	1,976	1,104,720	1,323,395	2,428,115	1,229
1974-1978	739	280,569	463,842	744,411	1,007
1969-1973	174	42,739	93,730	136,469	784
Before 1969	85	19,470	71,388	90,858	1,069
TOTAL	223,652	\$408,797,489	\$129,024,476	\$537,821,965	\$2,405

Monthly Allowances of Retired Lives by Years of Service as of December 31, 2020

Years of Service	No.	Initial	Post-Ret. Increase	Total	Average
<5 or n/a	8,815	\$ 3,551,022	\$ 530,744	\$ 4,081,766	\$ 463
5	4,016	1,566,554	535,259	2,101,813	523
6	3,347	1,505,808	488,815	1,994,623	596
7	3,285	1,580,912	495,897	2,076,809	632
8	3,163	1,725,543	529,934	2,255,477	713
9	2,578	1,584,278	432,779	2,017,057	782
10	8,905	4,820,620	1,702,651	6,523,271	733
11	5,634	3,668,061	1,166,397	4,834,458	858
12	5,714	4,000,415	1,246,131	5,246,546	918
13	5,465	4,311,317	1,318,500	5,629,817	1,030
14	5,226	4,387,723	1,336,830	5,724,553	1,095
15	5,670	5,142,819	1,573,118	6,715,937	1,184
16	5,393	5,167,982	1,623,253	6,791,235	1,259
17	5,019	5,296,657	1,646,273	6,942,930	1,383
18	5,021	5,573,200	1,729,981	7,303,181	1,455
19	4,664	5,387,646	1,806,474	7,194,120	1,542
20	6,975	9,292,490	2,526,992	11,819,482	1,695
21	5,579	7,704,693	2,321,979	10,026,672	1,797
22	5,293	7,902,392	2,414,765	10,317,157	1,949
23	5,170	8,203,213	2,530,796	10,734,009	2,076
24	4,919	8,259,528	2,527,051	10,786,579	2,193
25	10,559	19,342,858	6,322,921	25,665,779	2,431
26	6,343	12,447,282	4,130,798	16,578,080	2,614
27	6,247	13,135,198	4,538,359	17,673,557	2,829
28	6,845	15,811,508	5,753,220	21,564,728	3,150
29	6,455	16,094,965	5,657,687	21,752,652	3,370
30	34,196	93,444,488	29,074,924	122,519,412	3,583
31	10,731	31,803,003	9,028,489	40,831,492	3,805
32	7,651	23,164,485	7,205,808	30,370,293	3,969
33	5,776	18,232,782	5,709,740	23,942,522	4,145
34	4,457	14,408,800	4,705,677	19,114,477	4,289
35	4,009	13,305,511	4,337,196	17,642,707	4,401
36	2,805	9,395,564	3,107,687	12,503,251	4,457
37	2,185	7,352,430	2,489,472	9,841,902	4,504
38	1,576	5,385,996	1,751,017	7,137,013	4,529
39	1,203	4,077,665	1,438,503	5,516,168	4,585
40 & Over	2,763	10,762,081	3,288,359	14,050,440	5,085
TOTAL	223,652	\$408,797,489	\$129,024,476	\$537,821,965	\$2,405

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				
12/31/1991	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
12/31/2020	209,216	6,245	44.8 % **	69,701	69,701	100.0 %	1.3

* 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, 2020
Type of Benefit, Monthly Amount and Actuarial Liabilities

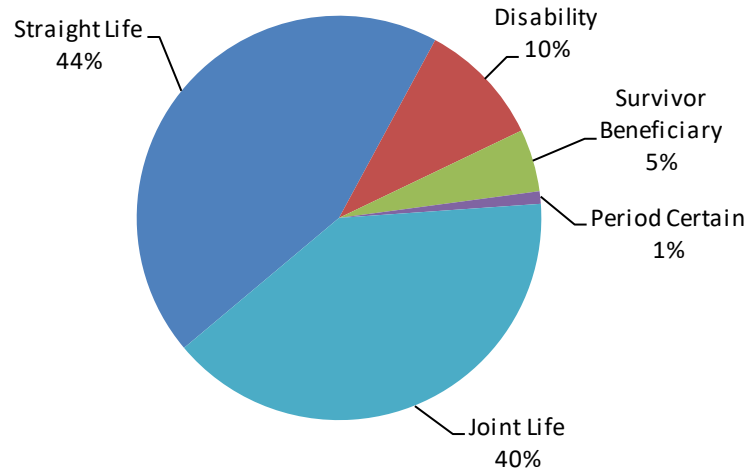
Type of Allowance	Number	Current Total	Actuarial Liabilities
Superannuation Retirement			
Multiple Life Plan/Plan A - Joint & 50%	23,586	\$ 69,850,592	\$ 9,852,506,156
Single Life Plan/Plan B - Straight Life	93,443	221,725,345	27,375,443,115
Multiple Life Plan/Plan C - Special Joint & Survivor	20,056	63,434,049	8,835,742,306
Multiple Life Plan/Plan D - Joint & 100%	27,850	77,428,046	12,563,831,245
Period Certain/Plan E - Life & 0 to 5 Years Guaranteed	297	670,997	77,453,800
- Life & 6 to 10 Years Guaranteed	432	937,613	107,365,995
- Life & 11 to 15 Years Guaranteed	596	1,155,673	134,759,678
- Life & 16 to 20 Years Guaranteed	62	167,395	23,983,998
Multiple Life Plan/Plan F - Multiple Continuing Beneficiaries	1,438	4,130,662	779,793,999
Reserve for Combined Plan Future Adverse Experience			1,369,124
Reserve for Member Directed Future Adverse Experience			16,484,426
Money Purchase	4,154	1,925,583	193,441,184
Survivor Beneficiary - Life Benefit	17,959	26,322,232	2,667,639,971
Survivor Beneficiary - Temporary Benefit	59	111,989	4,685,209
Total Superannuation	189,932	\$ 467,860,176	\$ 62,634,500,206
Disability Retirement	19,284	\$ 52,580,780	\$ 7,067,763,934
Total from A & PR	209,216	\$ 520,440,956	\$ 69,702,264,140

Annuity and Pension Reserve Fund
Retirees and Beneficiaries December 31, 2020
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						
Multiple Life Plan/Plan A - Joint & 50%	14,998	\$ 47,319,371	8,588	\$ 22,531,221	23,586	\$ 69,850,592
Single Life Plan/Plan B - Straight Life	28,893	77,170,746	64,550	144,554,599	93,443	221,725,345
Multiple Life Plan/Plan C - Special Joint & Survivor	9,250	33,897,439	10,806	29,536,610	20,056	63,434,049
Multiple Life Plan/Plan D - Joint & 100%	21,613	63,194,366	6,237	14,233,680	27,850	77,428,046
Period Certain/Plan E - Life & 0 to 5 Years Guaranteed	119	299,789	178	371,208	297	670,997
- Life & 6 to 10 Years Guaranteed	210	456,060	222	481,553	432	937,613
- Life & 11 to 15 Years Guaranteed	318	608,277	278	547,396	596	1,155,673
- Life & 16 to 20 Years Guaranteed	40	100,281	22	67,114	62	167,395
Multiple Life Plan/Plan F - Multiple Continuing Beneficiaries	544	1,851,188	894	2,279,474	1,438	4,130,662
Money Purchase	2,505	1,401,527	1,649	524,056	4,154	1,925,583
Survivor Beneficiary - Life Benefit	2,585	2,402,228	15,374	23,920,004	17,959	26,322,232
Survivor Beneficiary - Temporary Benefit	16	42,005	43	69,984	59	111,989
Total Superannuation	81,091	\$ 228,743,277	108,841	\$ 239,116,899	189,932	\$ 467,860,176
Disability Retirement	9,819	\$ 29,292,991	9,465	\$ 23,287,789	19,284	\$ 52,580,780
Total from A & PR	90,910	\$ 258,036,268	118,306	\$ 262,404,688	209,216	\$ 520,440,956

Annuities Being Paid by Type December 31, 2020

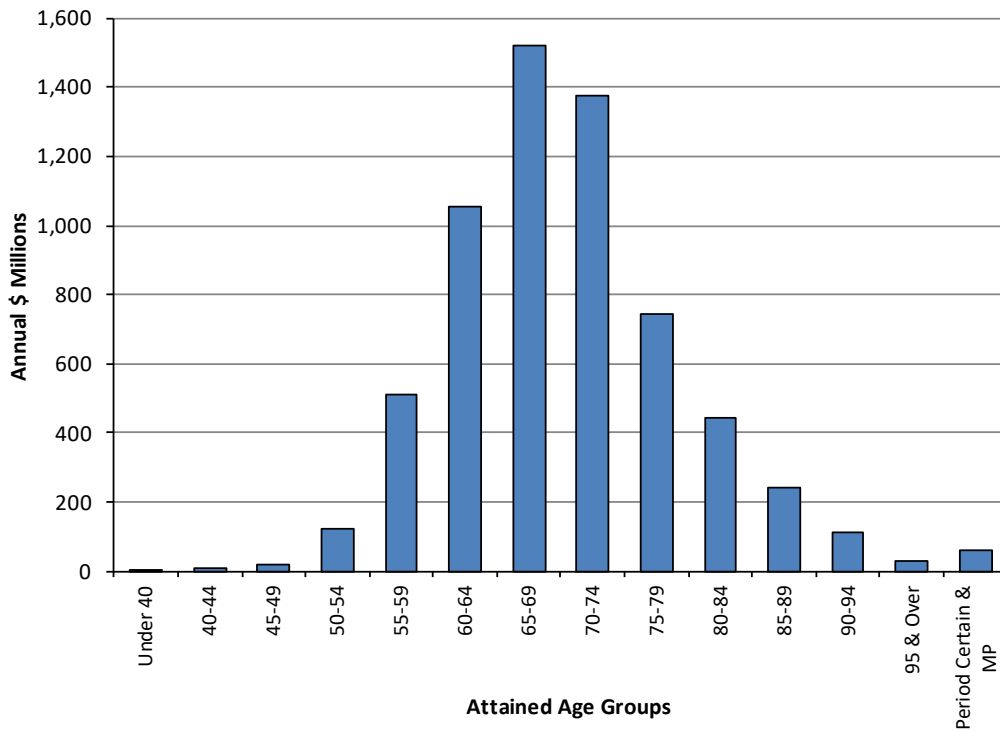
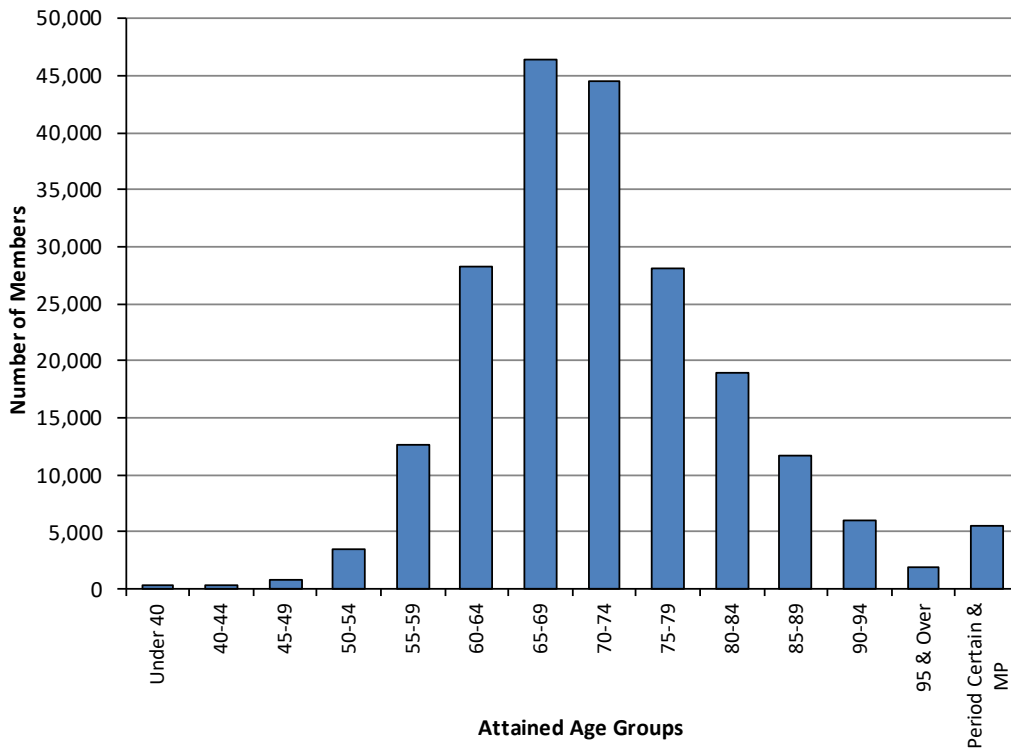
Annuity and Pension Reserve Fund



Annuity and Pension Reserve Fund
Retirees and Beneficiaries December 31, 2020
Current Monthly Total \$ by Attained Ages

Attained Ages	Superannuation		Disability		Totals	
	No.	Monthly Total	No.	Monthly Total	No.	Monthly Total
Under 20	17	\$ 12,848			17	\$ 12,848
20-24	23	24,083			23	24,083
25-29	51	33,216	3	\$ 3,219	54	36,435
30-34	56	45,573	14	24,794	70	70,367
35-39	52	43,144	76	138,464	128	181,608
40-44	85	70,880	283	561,250	368	632,130
45-49	107	120,386	741	1,660,412	848	1,780,798
50-54	1,777	5,866,770	1,694	4,580,034	3,471	10,446,804
55-59	9,273	32,780,005	3,337	9,719,252	12,610	42,499,257
60-64	23,463	74,466,938	4,766	13,568,222	28,229	88,035,160
65-69	42,962	116,045,856	3,523	10,549,966	46,485	126,595,822
70-74	41,940	107,407,101	2,632	7,184,772	44,572	114,591,873
75-79	26,720	58,818,000	1,313	2,980,735	28,033	61,798,735
80-84	18,440	35,686,649	587	1,156,271	19,027	36,842,920
85-89	11,539	19,904,520	220	335,246	11,759	20,239,766
90-94	5,986	9,196,855	79	101,434	6,065	9,298,289
95 & Over	1,900	2,480,091	16	16,709	1,916	2,496,800
Period Certain & Money Purchase	5,541	4,857,261			5,541	4,857,261
Totals	189,932	\$467,860,176	19,284	\$52,580,780	209,216	\$520,440,956

Annuity and Pension Reserve Fund Benefits Being Paid by Attained Ages December 31, 2020



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

Attained Age Group	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
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%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.4%	0.5%
40-49	0.6%	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%
50-59	7.7%	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%
60-69	35.7%	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%
70-79	34.8%	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%
80-89	14.7%	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%
90 & Over	3.8%	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%
Period Certain & Money Purchase	2.6%	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%
TOTALS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Age	71.5	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



STATE DIVISION
Survivor Benefit Fund Tabulated by
Type of Benefit Being Paid and Monthly Amount
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation			
Men	211	\$ 290,403	\$ 31,965,874
Women	600	1,076,281	123,766,979
Totals	811	\$ 1,366,684	\$ 155,732,853
S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount			
Males			
Widower	754	\$ 1,042,244	\$ 131,856,349
Parent	0	0	0
Other	2	1,473	275,864
Child	295	256,179	15,893,102
Subtotals - Male	1,051	\$ 1,299,896	\$ 148,025,315
Females			
Widow	2,122	\$ 3,246,241	\$ 437,324,946
Parent	0	0	0
Other	3	3,675	501,046
Child	276	239,882	13,079,415
Subtotals - Female	2,401	\$ 3,489,798	\$ 450,905,407
Totals	3,452	\$ 4,789,694	\$ 598,930,722
Total Benefits Being Paid from Survivor Benefit Fund			
Men	1,262	\$ 1,590,299	\$ 179,991,189
Women	3,001	4,566,079	574,672,386
Totals	4,263	\$ 6,156,378	\$ 754,663,575

LOCAL GOVERNMENT DIVISION
Survivor Benefit Fund Tabulated by
Type of Benefit Being Paid and Monthly Amount
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation			
Men	312	\$ 334,783	\$ 35,082,361
Women	1,269	1,732,734	195,983,122
Totals	1,581	\$ 2,067,517	\$ 231,065,483
S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount			
Males			
Widower	1,240	\$ 1,264,382	\$ 157,434,589
Parent	0	0	0
Other	0	0	0
Child	568	399,405	28,303,497
Subtotals - Male	1,808	\$ 1,663,787	\$ 185,738,086
Females			
Widow	5,073	\$ 5,897,390	\$ 772,029,639
Parent	2	2,241	171,719
Other	10	9,659	943,883
Child	540	389,592	22,882,138
Subtotals - Female	5,625	\$ 6,298,882	\$ 796,027,379
Totals	7,433	\$ 7,962,669	\$ 981,765,465
Total Benefits Being Paid from Survivor Benefit Fund			
Men	2,120	\$ 1,998,570	\$ 220,820,447
Women	6,894	8,031,616	992,010,501
Totals	9,014	\$ 10,030,186	\$ 1,212,830,948

PUBLIC SAFETY DIVISION
Survivor Benefit Fund Tabulated by
Type of Benefit Being Paid and Monthly Amount
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
S-1 - Survivor Benefit to Beneficiary of Deceased Member Joint and Survivor Computation			
Men	2	\$ 2,674	\$ 333,464
Women	20	36,870	5,058,702
Totals	22	\$ 39,544	\$ 5,392,166
S-2 - Survivor Benefit to Beneficiary of Deceased Member Fixed Rate Amount			
Males			
Widower	3	\$ 4,125	\$ 312,341
Other	0	0	0
Child	3	2,218	220,018
Subtotals - Male	6	\$ 6,343	\$ 532,359
Females			
Widow	88	\$ 141,067	\$ 19,657,021
Other	0	0	0
Child	4	3,635	491,021
Subtotals - Female	92	\$ 144,702	\$ 20,148,042
Totals	98	\$ 151,045	\$ 20,680,401
Total Benefits Being Paid from Survivor Benefit Fund			
Men	8	\$ 9,017	\$ 865,823
Women	112	181,572	25,206,744
Totals	120	\$ 190,589	\$ 26,072,567

LAW ENFORCEMENT DIVISION
Survivor Benefit Fund Tabulated by
Type of Benefit Being Paid and Monthly Amount
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
S-1 - Survivor Benefit to Beneficiary of Deceased Member			
Joint and Survivor Computation			
Men	1	\$ 1,427	\$ 164,491
Women	48	100,806	11,746,424
Totals	49	\$ 102,233	\$ 11,910,915
S-2 - Survivor Benefit to Beneficiary of Deceased Member			
Fixed Rate Amount			
Males			
Widower	15	\$ 15,875	\$ 2,227,726
Other	0	0	0
Child	64	53,925	2,530,779
Subtotals - Male	79	\$ 69,800	\$ 4,758,505
Females			
Widow	229	\$ 325,623	\$ 50,798,821
Other	0	0	0
Child	57	49,543	2,200,994
Subtotals - Female	286	\$ 375,166	\$ 52,999,815
Totals	365	\$ 444,966	\$ 57,758,320
Total Benefits Being Paid from Survivor Benefit Fund			
Men	80	\$ 71,227	\$ 4,922,996
Women	334	475,972	64,746,239
Totals	414	\$ 547,199	\$ 69,669,235

STATE DIVISION
Deferred Survivor Beneficiaries
Tabulated by Gender and Deferred Age
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
Widowers - Male			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	48	52,293	4,721,463
Deferred to age 65	0	0	0
Total - Male	48	\$ 52,293	\$ 4,721,463
Widows - Female			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	148	117,092	13,312,287
Deferred to age 65	0	0	0
Total - Female	148	\$ 117,092	\$ 13,312,287
Totals	196	\$ 169,385	\$ 18,033,750

LOCAL GOVERNMENT DIVISION
Deferred Survivor Beneficiaries
Tabulated by Gender and Deferred Age
December 31, 2020

Group	Number	Current Total	Actuarial Liabilities
Widowers - Males			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	111	72,771	8,431,494
Deferred to age 65	0	0	0
Total - Male	111	\$ 72,771	\$ 8,431,494
Widows - Female			
Deferred to age 50	0	\$ 0	\$ 0
Deferred to age 62	311	209,820	25,820,056
Deferred to age 65	0	0	0
Total - Female	311	\$ 209,820	\$ 25,820,056
Totals	422	\$ 282,591	\$ 34,251,550

PUBLIC SAFETY DIVISION
Deferred Survivor Beneficiaries
Tabulated by Gender and Deferred Age
December 31, 2020

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	3,033	311,136
Total - Female	5	\$ 3,033	\$ 311,136
Totals	5	\$ 3,033	\$ 311,136

LAW ENFORCEMENT DIVISION
Deferred Survivor Beneficiaries
Tabulated by Gender and Deferred Age
December 31, 2020

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	183,828
Total - Female	2	\$ 1,648	\$ 183,828
Totals	2	\$ 1,648	\$ 183,828

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			
12/31/1986	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 %
12/31/2020	13,811	16,924,352	625	456,657	2,116.0	2,116.0	100 %

@ Revised actuarial assumptions.

After benefit changes.

+ Includes certain recommended transfers and accrued transfers.

Retirees and Beneficiaries December 31, 2020

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
2020	223,652	58.0	23.4	\$22,422	71.4	\$29,505	\$25,884	\$45,397
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
2020	222,577	58.0	23.4	\$22,457	71.4	\$29,553	\$25,944	\$45,386
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
2020	744	64.9	11.4	\$4,849	69.8	\$5,294	\$4,476	\$51,079
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
2020	331	NA	NA	NA	NA	NA	NA	NA
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

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.

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		20%
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			
	State		Local Government	
	Men	Women	Men	Women
Year of Eligibility				
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	0.0426%	0.0142%	10.00%	10.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0469%	0.0150%	8.20%	9.28%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0416%	0.0200%	5.80%	7.30%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0507%	0.0303%	4.28%	5.10%	0.16%	0.16%	2.40%	3.25%	5.65%
40		0.0676%	0.0421%	3.14%	3.46%	0.29%	0.29%	1.90%	3.25%	5.15%
45		0.1066%	0.0620%	2.22%	2.42%	0.47%	0.47%	1.34%	3.25%	4.59%
50		0.1744%	0.1000%	1.84%	2.10%	0.67%	0.67%	0.92%	3.25%	4.17%
55		0.2742%	0.1672%	1.80%	2.10%	1.05%	1.05%	0.68%	3.25%	3.93%
60		0.4749%	0.2595%	1.80%	2.10%	1.25%	1.25%	0.42%	3.25%	3.67%
65		0.9079%	0.3844%	1.80%	2.10%	1.25%	1.25%	0.12%	3.25%	3.37%
70	1.5734%	0.6439%	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 2020 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	0.0426%	0.0142%	10.00%	11.00%	0.10%	0.10%	5.00%	3.25%	8.25%
25		0.0469%	0.0150%	7.78%	9.32%	0.10%	0.10%	4.64%	3.25%	7.89%
30		0.0416%	0.0200%	5.34%	6.94%	0.10%	0.10%	3.38%	3.25%	6.63%
35		0.0507%	0.0303%	3.86%	5.02%	0.13%	0.10%	2.34%	3.25%	5.59%
40		0.0676%	0.0421%	2.82%	3.52%	0.21%	0.16%	1.77%	3.25%	5.02%
45		0.1066%	0.0620%	2.26%	2.70%	0.37%	0.26%	1.28%	3.25%	4.53%
50		0.1744%	0.1000%	2.04%	2.50%	0.63%	0.42%	0.92%	3.25%	4.17%
55		0.2742%	0.1672%	2.00%	2.50%	0.90%	0.71%	0.68%	3.25%	3.93%
60		0.4749%	0.2595%	2.00%	2.50%	1.00%	0.85%	0.42%	3.25%	3.67%
65		0.9079%	0.3844%	2.00%	2.50%	1.00%	0.85%	0.12%	3.25%	3.37%
70	1.5734%	0.6439%	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 2020 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	0.0426%	0.0142%	10.00%	10.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0469%	0.0150%	10.00%	10.00%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0416%	0.0200%	8.80%	8.80%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0507%	0.0303%	6.20%	6.20%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0676%	0.0421%	3.50%	3.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1066%	0.0620%	2.20%	2.20%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1744%	0.1000%	2.00%	2.00%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2742%	0.1672%	2.00%	2.00%	2.32%	2.65%	0.60%	3.25%	3.85%
60	0.4749%	0.2595%	2.00%	2.00%	2.60%	2.75%	0.40%	3.25%	3.65%	
65	0.9079%	0.3844%	2.00%	2.00%	2.60%	2.75%	0.16%	3.25%	3.41%	
70	1.5734%	0.6439%	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 2020 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	0.0426%	0.0142%	4.50%	5.00%	0.20%	0.60%	7.50%	3.25%	10.75%
25		0.0469%	0.0150%	3.54%	3.80%	0.20%	0.60%	6.30%	3.25%	9.55%
30		0.0416%	0.0200%	2.66%	2.90%	0.23%	0.60%	3.70%	3.25%	6.95%
35		0.0507%	0.0303%	2.14%	2.30%	0.34%	0.60%	2.02%	3.25%	5.27%
40		0.0676%	0.0421%	1.48%	1.50%	0.52%	0.87%	1.46%	3.25%	4.71%
45		0.1066%	0.0620%	1.20%	1.30%	0.78%	1.38%	1.12%	3.25%	4.37%
50		0.1744%	0.1000%	1.20%	1.20%	1.50%	2.14%	0.94%	3.25%	4.19%
55		0.2742%	0.1672%	1.20%	1.20%	2.32%	2.65%	0.60%	3.25%	3.85%
60		0.4749%	0.2595%	1.20%	1.20%	2.60%	2.75%	0.40%	3.25%	3.65%
65		0.9079%	0.3844%	1.20%	1.20%	2.60%	2.75%	0.16%	3.25%	3.41%
70	1.5734%	0.6439%	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 2020 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	\$193.77	\$202.51	33.96	37.40
55	181.19	191.02	29.21	32.44
60	165.97	177.12	24.60	27.63
65	148.17	160.70	20.22	23.04
70	128.28	141.66	16.15	18.69
75	106.82	120.37	12.47	14.66
80	84.88	97.76	9.23	11.05
Ref:	:#2135x1sb0	:#2136x1sb0		

*Attained Age during the 2020 Calendar Year.

Miscellaneous and Technical Assumptions

December 31, 2020

Marriage Assumption:	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.
Pay Increase Timing:	Beginning of year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Final Average Salary:	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.
Decrement Timing:	Decrements are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and mortality decrements do not operate during the first 5 years of service. The withdrawal decrement does not operate for members eligible to retire.
Death after Disability:	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.
Service Credit Accruals:	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.
Minimum Earnable Salary:	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 2021 was \$684.86 per month.
Qualified Excess Benefit Arrangement (QEBA):	Benefit amounts, if any, in excess of the IRC §415(b) limits are paid through a QEBA and are included in the actuarial valuation results.

Miscellaneous and Technical Assumptions

December 31, 2020 (Concluded)

Miscellaneous Loads:	<ul style="list-style-type: none">• A load of approximately 0.47% of payroll is included in the computed normal cost to recognize subsidized service purchases.• 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.• 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.
Transition Groups Under Senate Bill #343:	If the transition group data field was populated and it was A or B, the OPERS provided transition group was used. For all other records (i.e., the provided transition group was C or blank), the member's transition group was estimated based upon first eligibility of retirement (assuming future service accruals for active members).
Cost-of-Living Adjustments:	For individuals retiring after January 7, 2013, cost-of-living adjustments were assumed to be 0.50% for calendar year 2021 and 2.15% thereafter. Increases assumed to occur on anniversary of benefit effective date.
Incidence of Contributions:	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.
Other Contributions:	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.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Normal Form of Benefit:	The assumed normal form of benefit is a straight life benefit, except where otherwise noted.
Missing Member Data and Member Data Adjustments:	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

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 3rd 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.***

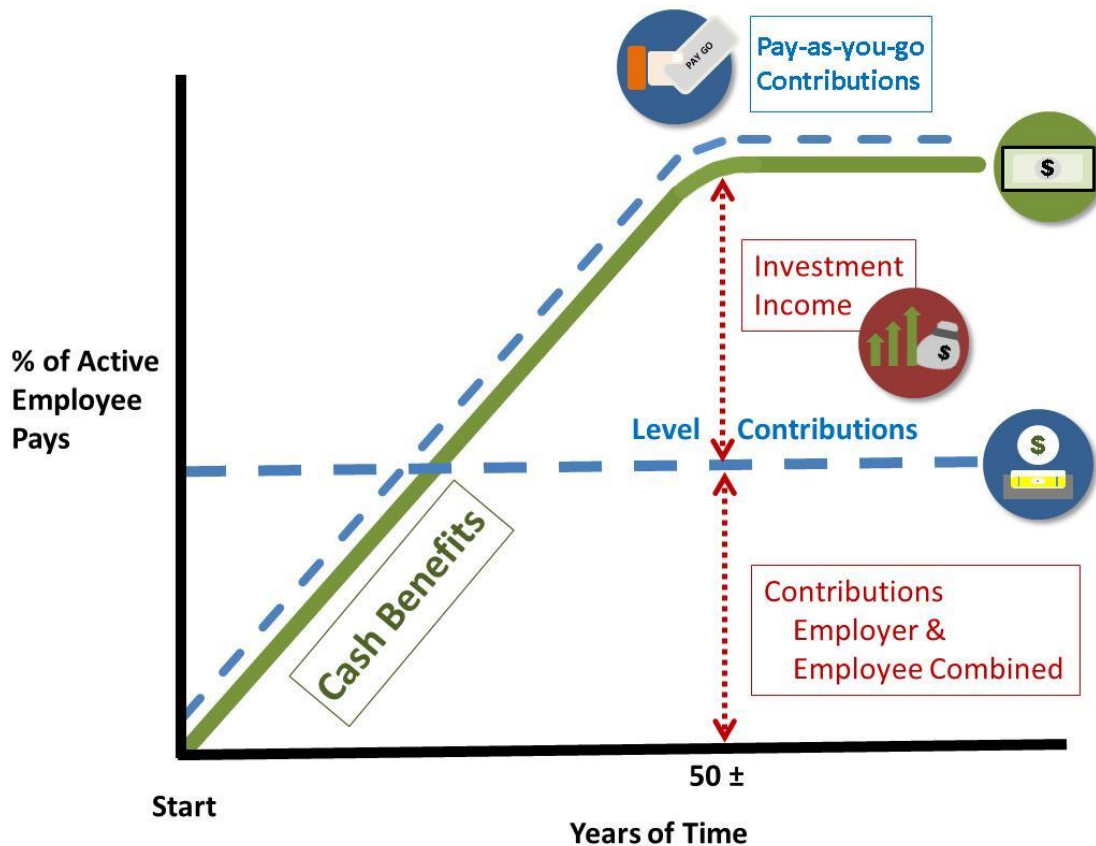
An actuarial valuation has a number of ingredients such as: the rate of investment return which plan assets will earn; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual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

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

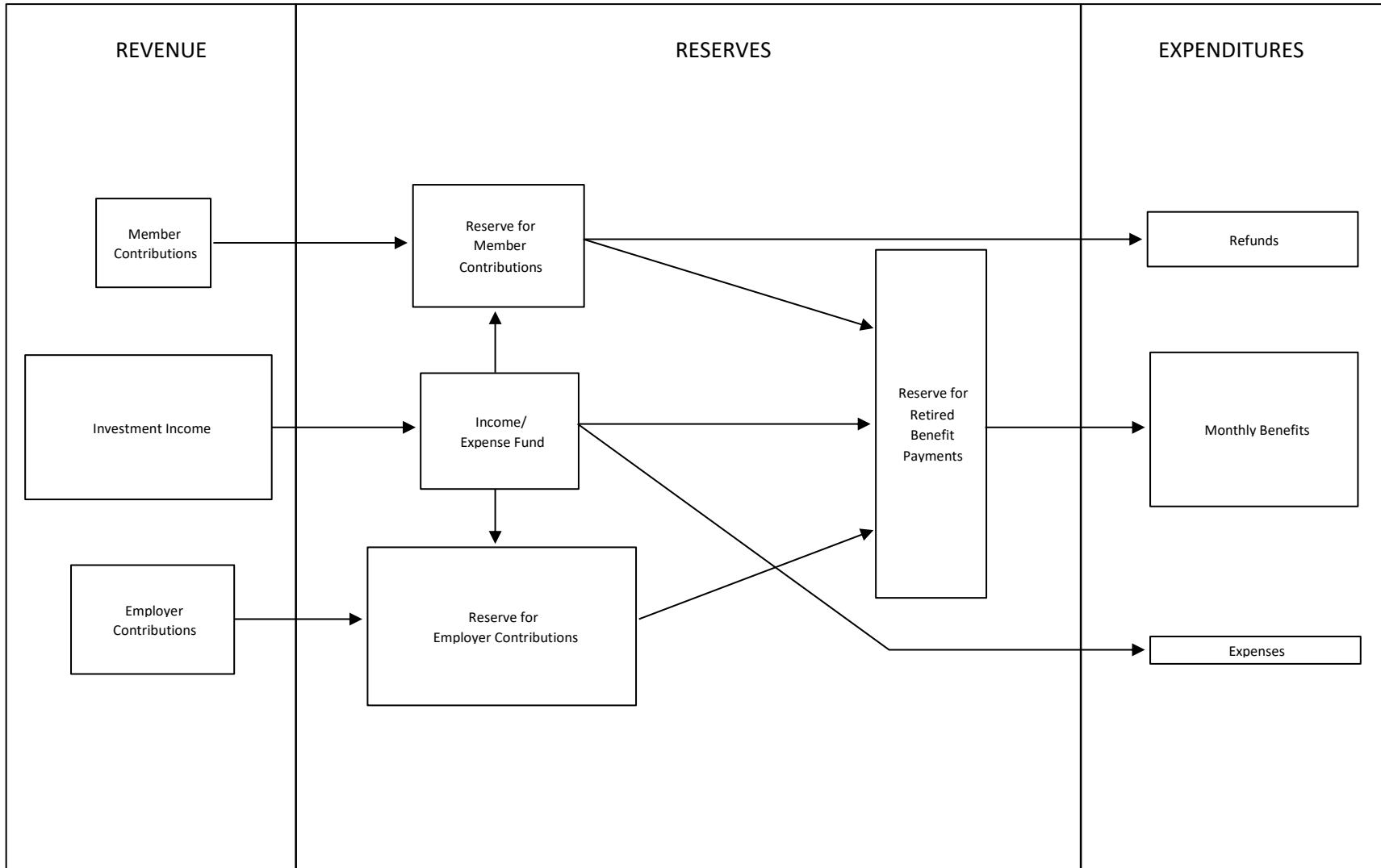
- D. + **Assumptions concerning future experience** in various risk areas

- 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.

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.

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

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
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 %
2020	113,372	93,969	19,402	83 %	14,383	135 %

@ 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 [^]	UAAL as a % of Covered Payroll
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 %
2020	112,833	93,180	19,652	83 %	13,940	141 %

[^] 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 [^]	UAAL as a % of Covered Payroll
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 %
2020	502	752	(250)	150 %	443	0 %

[^] 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
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
2020	37,150,719	37,150,719	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%
2020	2023	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%
2020	2023	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
2020	2023	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, 2020					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
Accrued Liabilities						
Active and Inactive Members	\$ 15,988,358,860	\$ 23,327,685,300	\$ 39,316,044,160	\$ 8,438,432	\$ 2,228,806,260	\$ 41,553,288,852
Retirees and Beneficiaries	28,731,903,731	40,134,137,211	68,866,040,942	55,801,788	2,896,437,998	71,818,280,728
Total Accrued Liabilities	\$ 44,720,262,591	\$ 63,461,822,511	\$ 108,182,085,102	\$ 64,240,220	\$ 5,125,244,258	\$ 113,371,569,580
Assets						
Active and Inactive Members						
EAF*	\$ 2,953,726,516	\$ 7,313,891,111	\$ 10,267,617,627	\$ (22,581,273)	\$ 1,110,939,845	\$ 11,355,976,199
ESF	5,891,121,014	8,866,993,327	14,758,114,341	3,531,251	792,625,171	15,554,270,763
Unallocated	47,261,273	70,857,783	118,119,056	46,646	6,092,298	124,258,000
Funding Value of Assets Adjustment	(1,858,715,037)	(2,785,638,358)	(4,644,353,395)	(1,818,643)	(237,525,776)	(4,883,697,814)
Total Active and Inactive Assets	\$ 7,033,393,766	\$ 13,466,103,863	\$ 20,499,497,629	\$ (20,822,019)	\$ 1,672,131,538	\$ 22,150,807,148
Retirees and Beneficiaries						
A & PR Fund*	\$ 27,951,315,027	\$ 38,878,461,666	\$ 66,829,776,693	\$ 29,418,085	\$ 2,826,584,935	\$ 69,685,779,713
SBF Fund*	772,697,325	1,247,082,498	2,019,779,823	26,383,703	69,853,063	2,116,016,589
Reserve for Future MD Adverse Experience^	7,891,379	8,593,047	16,484,426	0	0	16,484,426
Total R&B Assets	\$ 28,731,903,731	\$ 40,134,137,211	\$ 68,866,040,942	\$ 55,801,788	\$ 2,896,437,998	\$ 71,818,280,728
Total Assets	\$ 35,765,297,497	\$ 53,600,241,074	\$ 89,365,538,571	\$ 34,979,769	\$ 4,568,569,536	\$ 93,969,087,876
Unfunded Actuarial Accrued Liability	\$ 8,954,965,094	\$ 9,861,581,437	\$ 18,816,546,531	\$ 29,260,451	\$ 556,674,722	\$ 19,402,481,704

@ 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, 2020					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
Accrued Liabilities						
Active and Inactive Members	\$ 15,788,464,010	\$ 23,069,551,611	\$ 38,858,015,621	\$ 8,438,432	\$ 2,228,806,260	\$ 41,095,260,313
Retirees and Beneficiaries	28,701,578,595	40,083,462,776	68,785,041,371	55,801,788	2,896,437,998	71,737,281,157
Total Accrued Liabilities	\$ 44,490,042,605	\$ 63,153,014,387	\$ 107,643,056,992	\$ 64,240,220	\$ 5,125,244,258	\$ 112,832,541,470
Assets						
Active and Inactive Members						
EAF*	\$ 2,645,024,523	\$ 6,879,641,709	\$ 9,524,666,232	\$ (22,581,273)	\$ 1,110,939,845	\$ 10,613,024,804
ESF	5,889,634,633	8,864,363,597	14,753,998,230	3,531,251	792,625,171	15,550,154,652
Unallocated	47,261,273	70,857,783	118,119,056	46,646	6,092,298	124,258,000
Funding Value of Assets Adjustment	(1,842,616,812)	(2,762,594,651)	(4,605,211,463)	(1,818,643)	(237,525,776)	(4,844,555,882)
Total Active and Inactive Assets	\$ 6,739,303,617	\$ 13,052,268,438	\$ 19,791,572,055	\$ (20,822,019)	\$ 1,672,131,538	\$ 21,442,881,574
Retirees and Beneficiaries						
A & PR Fund*	\$ 27,928,881,270	\$ 38,836,380,278	\$ 66,765,261,548	\$ 29,418,085	\$ 2,826,584,935	\$ 69,621,264,568
SBF Fund*	772,697,325	1,247,082,498	2,019,779,823	26,383,703	69,853,063	2,116,016,589
Total R&B Assets	\$ 28,701,578,595	\$ 40,083,462,776	\$ 68,785,041,371	\$ 55,801,788	\$ 2,896,437,998	\$ 71,737,281,157
Total Assets	\$ 35,440,882,212	\$ 53,135,731,214	\$ 88,576,613,426	\$ 34,979,769	\$ 4,568,569,536	\$ 93,180,162,731
Unfunded Actuarial Accrued Liability	\$ 9,049,160,393	\$ 10,017,283,173	\$ 19,066,443,566	\$ 29,260,451	\$ 556,674,722	\$ 19,652,378,739

@ 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, 2020					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
Accrued Liabilities						
Active and Inactive Members	\$ 199,894,850	\$ 258,133,689	\$ 458,028,539			\$ 458,028,539
Retirees and Beneficiaries	15,982,219	27,866,633	43,848,852			43,848,852
Total Accrued Liabilities	\$ 215,877,069	\$ 286,000,322	\$ 501,877,391			\$ 501,877,391
Assets						
Active and Inactive Members						
EAF*	\$ 308,043,978	\$ 433,257,405	\$ 741,301,383			\$ 741,301,383
ESF	1,470,865	2,550,693	4,021,558			4,021,558
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(15,424,694)	(21,972,673)	(37,397,367)			(37,397,367)
Total Active and Inactive Assets	\$ 294,090,149	\$ 413,835,425	\$ 707,925,574			\$ 707,925,574
Retirees and Beneficiaries						
A & PR Fund*	\$ 15,982,219	\$ 27,866,633	\$ 43,848,852			\$ 43,848,852
SBF Fund*	0	0	0			0
Total R&B Assets	\$ 15,982,219	\$ 27,866,633	\$ 43,848,852			\$ 43,848,852
Total Assets	\$ 310,072,368	\$ 441,702,058	\$ 751,774,426			\$ 751,774,426
Unfunded Actuarial Accrued Liability	\$ (94,195,299)	\$ (155,701,736)	\$ (249,897,035)			\$ (249,897,035)

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

* After reserve transfers.

Schedule of Unfunded Actuarial Accrued Liability[@] DB Portion of Member Directed Plan

	December 31, 2020					
	General			Public Safety	Law Enforcement	Grand Total
	State	Local	Total			
Accrued Liabilities						
Active and Inactive Members	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries	14,342,917	22,807,802	37,150,719			37,150,719
Total Accrued Liabilities	\$ 14,342,917	\$ 22,807,802	\$ 37,150,719			\$ 37,150,719
Assets						
Active and Inactive Members						
EAF*	\$ 658,015	\$ 991,997	\$ 1,650,012			\$ 1,650,012
ESF	15,516	79,037	94,553			94,553
Unallocated	0	0	0			0
Funding Value of Assets Adjustment	(673,531)	(1,071,034)	(1,744,565)			(1,744,565)
Total Active and Inactive Assets	\$ 0	\$ 0	\$ 0			\$ 0
Retirees and Beneficiaries						
A & PR Fund*	\$ 6,451,538	\$ 14,214,755	\$ 20,666,293			\$ 20,666,293
SBF Fund*	0	0	0			0
Reserve for Future Adverse Experience^	7,891,379	8,593,047	16,484,426			16,484,426
Total R&B Assets	\$ 14,342,917	\$ 22,807,802	\$ 37,150,719			\$ 37,150,719
Total Assets	\$ 14,342,917	\$ 22,807,802	\$ 37,150,719			\$ 37,150,719
Unfunded Actuarial Accrued Liability	\$ 0	\$ 0	\$ 0			\$ 0

[@] 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, 2020		
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	18 years	(Ending December 31, 2039)	
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: 0.5% for calendar year 2021, then 2.15% simple		

		Member			
		Traditional	Combined	Directed	Total
Retirees and beneficiaries receiving benefits		222,577	744	331	223,652
Terminated plan members entitled to but not yet receiving benefits					
	Less than 5 years of service	616,874	1,469	0	618,343
	5 or more years of service	39,319	886	0	40,205
	Total	656,193	2,355	0	658,548
Active plan members					
	Less than 5 years of service	107,242	1,989	0	109,231
	5 or more years of service	164,103	5,275	0	169,378
	Total	271,345	7,264	0	278,609
Total					
	Less than 5 years of service	724,116	3,458	0	727,574
	5 or more years of service	425,999	6,905	331	433,235
	Total	1,150,115	10,363	331	1,160,809





September 1, 2021

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

Re: Report of the December 31, 2020 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:ah
Enclosures

cc: Ms. Tonia Wildasin
CliftonLarsonAllen LLP