

University of Puerto Rico Retirement System



Actuarial Valuation Report

Prepared as of June 30, 2023



September 30, 2024

Retirement Board and Governing Board
 University of Puerto Rico
 Retirement System
 P.O. Box 21769
 San Juan, Puerto Rico 00925

Dear Board Members:

We are pleased to submit the results of the annual actuarial valuation of the University of Puerto Rico Retirement System (the System) as of June 30, 2023.

The purpose of this report is to provide a summary of the funded status of the System as of June 30, 2023 and to recommend rates of contribution. While not verifying the data at source, the actuary performed tests for consistency and reasonability.

Since the previous valuation, certain actuarial assumptions have been changed as a result of the experience study for the period ending June 30, 2022:

Assumption	Description
Withdrawal Rates	No change
Retirement Rates	Adjusted Assumed Rates of Retirement
Disability Rates	No change
Pre-Retirement Mortality Rates	Update current mortality table to Pub 2010 Teachers Employees Below Median Amount-Weighted Mortality Table, projected generationally using scale MP-2021
Post-Retirement Healthy Mortality Rates	Update current mortality table to Pub 2010 Teachers Retirees Below Median Amount-Weighted Mortality Table, projected generationally using scale MP-2021
Post-Retirement Disabled Mortality Rates	Update current mortality table to Pub 2010 Teachers Disabled Retiree Amount-Weighted Mortality Table
Post-Retirement Beneficiary Mortality Rates	Update current mortality table to Pub 2010 Teachers Below Median Amount-Weighted Contingent Survivors Mortality Table, projected generationally using scale MP-2021
Price Inflation	No change
Wage Inflation	Increased from 2.75% to 3.50%
Investment Return	No change
Expense Assumption	No change



In the table below, we present the contribution rates and estimated required University contribution amount for fiscal year 2025. For comparison we also present the contribution rates and amounts for fiscal year 2024 based on the 2022 valuation.

Valuation Date	June 30, 2023	June 30, 2022
Recommended Contributions for Fiscal Year	2025	2024
Total Contribution Rate	49.93%	48.37%
Average Member Contribution Rate	9.91%	9.34%
University Contribution Rate	40.02%	39.03%
Estimated University Contribution (\$'s millions)	\$ 155.8	\$ 154.7
Actuarial Value Assets Funded Status	51.2%	49.9%
Payroll Growth Assumption	0.00%	0.00%

The promised benefits of the System are included in the actuarially calculated contribution rates, which are developed using the individual entry age normal cost method. A five-year smoothing of the market value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level dollar amount over a closed 30-year period beginning June 30, 2014, on the assumption that payroll will increase by 0.0% per year and the amortization period will decrease by one year until reaching 0 years. The assumptions recommended by the actuary are, in the aggregate, reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System.

Future actuarial results may differ significantly from the current results 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.



The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

Todd B. Green, ASA, EA, FCA, MAAA
President

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SECTION I – SUMMARY OF PRINCIPAL RESULTS



- For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized in the following table.

SUMMARY OF PRINCIPAL RESULTS

	June 30, 2023	June 30, 2022
Number of Active Members	8,029	8,304
Annual Covered Payroll (Salary used for valuation purposes)	\$389,396,542	\$396,438,088
Number of Retired and Disabled Members and Survivors	9,379	9,390
Annual Benefits	\$222,828,972	\$218,823,813
Number of Terminated Vested Members	601	578
Number of Non-Vested Terminated Members	5,941	5,758
Total Assets*		
Actuarial Value	\$1,688,328,166	\$1,650,222,049
Market Value	\$1,609,705,074	\$1,554,402,617
Actuarial Accrued Liability	\$3,300,628,180	\$3,308,098,964
Unfunded Actuarial Accrued Liability*	\$1,612,300,014	\$1,657,876,915
Actuarial Value Assets Funded Status	51.2%	49.9%
Market Value Assets Funded Status	48.8%	47.0%
CONTRIBUTIONS FOR FISCAL YEAR ENDING	June 30, 2025	June 30, 2024
Total Contribution Rate:		
Normal (Including Administrative Expenses)	11.24%	10.11%
Unfunded Accrued Liability*	<u>38.69%</u>	<u>38.26%</u>
Total Contribution Rate*	49.93%	48.37%
Average Member Contribution Rate	9.91%	9.34%
University Contribution Rate as a % of payroll*	40.02%	39.03%
Amortization Period	21 years	22 years

*Assets include \$1,936,322 in retirement contributions due. Without this amount, the UAAL would be \$1,614,236,336 and the required University contribution rate would be 40.07%.



SECTION I – SUMMARY OF PRINCIPAL RESULTS



2. Comments on the valuation results as of June 30, 2023 are given in Section IV and further discussion of the contribution levels is set out in Section V.
3. Schedule B shows the development of the actuarial value of assets. Schedules D and E of this report outline the full set of actuarial assumptions and methods used in the current valuation. The valuation reflects the following assumption changes based on the most recent experience study:
 - Adjusted assumed rates of retirement
 - Updated current Pub 2010 mortality tables to Pub 2010 Below Median mortality tables
 - Increased real wage growth assumption to 1.00%
 - Increased wage inflation assumption to 3.50%
4. The valuation takes into account the effect of amendments to the System through the valuation date. The Main Provisions of the System, as summarized in Schedule F, were taken into account in the current valuation.



SECTION II – MEMBERSHIP DATA



- Membership data for use in the valuation was furnished by the System. The following table shows the number of active members and their annual compensation for valuation purposes, as of June 30, 2023, on which the valuation was based.

TABLE 1

**THE NUMBER AND ANNUAL COMPENSATION OF
ACTIVE MEMBERS AS OF JUNE 30, 2023**

Number	Compensation	Average Compensation	Average Age	Average Service
8,029	\$389,396,542	\$48,499	51.5	18.7

- The following table shows a five-year history of active member valuation data.

TABLE 2

SCHEDULE OF TOTAL ACTIVE MEMBER VALUATION DATA

Valuation Date	Number	Annual Compensation	Average Annual Compensation	% Increase in Average Compensation
6/30/2023	8,029	\$389,396,542	\$48,499	1.6%
6/30/2022	8,304	396,438,088	47,741	0.4
6/30/2021	8,252	392,498,511	47,564	2.8
6/30/2020	8,790	406,675,782	46,266	-1.2
6/30/2019	9,140	428,085,691	46,837	-0.6



SECTION II – MEMBERSHIP DATA



3. The following table shows the number and annual retirement benefits payable to retired members and survivors on the roll of the System as of the valuation date.

TABLE 3

**THE NUMBER AND ANNUAL RETIREMENT BENEFITS
OF RETIRED MEMBERS AND SURVIVORS OF DECEASED MEMBERS
AS OF JUNE 30, 2023**

Type of Retirement	Number	Annual Benefits	Average Monthly Benefit	Average Age	Actuarial Liabilities
Retiree	8,431	\$214,415,982	\$2,119	73.5	\$2,014,355,183
Disability	919	\$8,142,655	\$738	71.7	\$64,157,196
Beneficiary	29	\$270,335	\$777	71.9	\$2,036,270
Total	9,379	\$222,828,972	\$1,980		\$2,080,548,649

4. Schedule G shows the distribution by age and service of the number and annual compensation of active members.



SECTION III – ASSETS



Schedule C shows the additions and deductions for the year preceding the valuation date and a reconciliation of the fund balances at market value. The market value of assets as of June 30, 2023 used to determine the actuarial value of assets is shown below. The market related actuarial value of assets used for the current valuation was \$1,688,328,166. Schedule B shows the development of the actuarial value of assets. The following table shows historical asset information. The market value return over the 20-year period shown below was 7.53%.

TABLE 4
HISTORICAL ASSET INFORMATION
(in \$1,000s)

Plan Year	Market Value as of June 30	Actuarial Value as of June 30	Benefit Payments	Expenses	University and Member Contribs.	Market Value Yield	Actuarial Value Yield
2023	\$1,609,705	\$1,688,328	\$224,559	\$4,729	\$174,515	7.2%	5.7%
2022	1,554,403	1,650,222	222,314	3,721	192,909	-10.5%	7.0%
2021	1,772,587	1,573,957	220,633	3,578	189,510	24.1%	10.8%
2020	1,459,232	1,453,149	218,290	3,639	195,663	5.9%	6.8%
2019	1,403,702	1,385,992	207,823	3,751	108,112	7.3%	6.5%
2018	1,408,376	1,401,187	198,247	4,458	109,223	8.2%	9.2%
2017	1,385,630	1,371,979	188,311	4,120	112,244	10.3%	10.2%
2016	1,332,668	1,321,210	182,614	4,075	116,643	4.5%	9.6%
2015	1,342,996	1,272,123	176,872	4,172	123,845	5.8%	12.9%
2014	1,325,365	1,179,752	169,163	3,914	129,589	18.2%	14.6%
2013	1,161,569	1,070,402	162,182	3,777	115,333	15.2%	8.1%
2012	1,055,909	1,039,441	153,890	3,518	114,405	4.5%	4.0%
2011	1,052,467	1,041,628	143,198	3,070	110,823	20.9%	4.8%
2010	902,867	1,028,918	133,113	3,709	112,915	13.0%	1.8%
2009	821,867	1,034,645	124,353	3,935	116,436	-12.7%	2.1%
2008	954,307	1,024,987	118,779	3,640	124,518	-5.0%	7.3%
2007	1,002,117	953,197	110,831	3,443	118,341	14.8%	9.2%
2006	869,349	869,211	105,090	3,263	112,368	7.3%	5.4%
2005	806,229	820,501	100,459	3,781	105,755	8.2%	1.9%
2004	743,761	803,498	94,188	2,675	102,369	11.4%	2.5%



SECTION IV – COMMENTS ON VALUATION



1. The total valuation balance sheet on account of benefits shows that the System has total prospective benefit liabilities of \$3,531,825,597, of which \$2,080,548,649 is for the prospective benefits payable on account of present retired members, disabled members and survivors of deceased members, \$83,830,137 is for the prospective benefits payable on account of inactive members entitled to future benefits, and \$1,367,446,811 is for the prospective benefits payable on account of present active members. Against these benefit liabilities the System has a total present actuarial value of assets of \$1,688,328,166 as of June 30, 2023. The difference of \$1,843,497,431 between the total liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, \$205,543,006 is the present value of future contributions expected to be made by members, and the balance of \$1,637,954,425 represents future University contributions.
2. The University's contributions to the System consist of normal contributions and unfunded actuarial accrued liability (UAAL) contributions. The valuation indicates that employer normal contributions at the rate of 1.33% of payroll are required. Prospective employer normal contributions have a present value of \$25,654,411. When this amount is subtracted from \$1,637,954,425, which is the present value of the total future contributions to be made by the employers, there remains \$1,612,300,014 as the amount of future UAAL contributions.
3. In accordance with Board Certification Nos. 9 and 38, the accrued liability contribution rate payable on account of retirement benefits has been set at 38.69% of payroll. This rate is sufficient to liquidate the unfunded accrued liability of \$1,612,300,014 over 21 years beginning June 30, 2023 on a level dollar basis.



SECTION V – CONTRIBUTIONS PAYABLE BY EMPLOYER



The employer contribution rates according to the Rules and Regulations of the System are shown in the following table.

TABLE 5

	June 30, 2023	June 30, 2022
A. Funding Results		
1. Present Value of Future Benefits	\$3,531,825,597	\$3,534,987,390
2. Actuarial Value of Assets	<u>1,688,328,166</u>	<u>1,650,222,049</u>
3. PV of Future Contributions (1) – (2)	1,843,497,431	1,884,765,340
4. PV of Future Member Contributions	<u>205,543,006</u>	<u>216,605,424</u>
5. PV of Future University Contributions (3) – (4)	1,637,954,425	1,668,159,916
6. PV of Future University Normal Conts.	<u>25,654,411</u>	<u>10,283,002</u>
7. Unfunded Accrued Liability (5) – (6)	1,612,300,014	1,657,876,915
B. Annual Contribution Rate (% of payroll)		
For Fiscal Year Ending		
	June 30, 2025	June 30, 2024
1. Total		
a. Normal rate (including expenses)	11.24%	10.11%
b. Unfunded accrued liability	<u>38.69%</u>	<u>38.26%</u>
c. Sub-total	49.93%	48.37%
2. Members	<u>9.91%</u>	<u>9.34%</u>
3. University	40.02%	39.03%





CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITIES (UAAL) DURING PLAN YEAR

1) Beginning of Year:	
a) Unfunded Actuarial Accrued Liability	\$1,657,876,915
b) Total Normal Cost (including expenses)	35,498,355
c) Expected Total Contributions based on prior valuation contribution rate with Administrative Expenses	184,730,558
d) Actual Total Contributions based on contribution rate applicable to current fiscal year	174,514,929
2) End of Year:	
a) Expected UAAL from previous valuation $[(1a) + (1b)] * 1.0675 - (1c) * 1.03375$	\$1,616,712,887
b) Expected UAAL on actual contributions $[(1a) + (1b)] * 1.0675 - (1d) * 1.03375$	1,627,338,644
c) Increase (Decrease) in UAAL due to deficiency (surplus) $(2b) - (2a)$	10,625,757
3) Gains / (Losses) on Year's Activities	
a) Liability – Assumed vs. Actual	\$10,250,336
b) Assets – Assumed vs. Actual	(16,597,468)
c) Change in Plan Assumptions	21,385,762
d) Change in Plan Provisions	0
e) Change in Methods	0
f) Total	\$15,038,630
4) Actual UAAL at End of Year $(2a) + (2c) - (3f)$	\$1,612,300,014

* Expected Total Contributions are based on the Annual Required Contribution (ARC) rate, the average member contribution rate, and annual covered payroll as of the previous valuation date.





GAINS & (LOSSES) IN ACTUARIAL ACCRUED LIABILITIES DURING PLAN YEAR

Type of Activity	Gain (or Loss)
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	\$12,528,353
Disability Retirements. If disability claims are less than assumed, there is a gain. If more, a loss.	152,061
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(592,218)
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	7,109,933
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	1,496,037
New Members. Additional unfunded accrued liability will produce a loss.	(2,275,813)
Contribution Income. If more contributions are received than expected, there is a gain. If less, a loss	(10,625,757)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(16,597,468)
Death After Retirement. If retirees live longer than assumed, there is a loss. If not as long, a gain.	9,020,717
Other. Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, etc.	<u>(17,188,734)*</u>
Gain (or Loss) During Year From Financial Experience	\$(16,972,889)
Non-Recurring Items. Adjustments for plan amendments, assumptions changes and method changes.	<u>21,385,762</u>
Composite Gain (or Loss) During Year	\$4,412,873

*Includes gains and losses resulting from database clean up.



SECTION VII – RISK CONSIDERATION



Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September 2017, Actuarial Standard of Practice Number 51, Assessment and Disclosure of Risk in Measuring Pension Obligations, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the June 30, 2019 actuarial valuation for the System.

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If the System's assets are depleted, benefits may not be paid which could create legal and litigation risk or the plan could become "pay as you go." The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. The System is primarily funded by member and employer contributions to the trust fund, together with the earnings on these accumulated contributions. These contributions fund benefit accruals for current active members and administrative expenses. The remainder of the contributions amortizes the unfunded actuarial accrued liability. The required contribution rate is the sum of the rates for the normal cost for the plan and the amortization of the unfunded actuarial accrued liability. The required contribution rate is sensitive to increases in the UAAL and periods of lower-than-expected returns would lead to much higher contribution rates as a percentage of payroll.





The other significant risk factor for the System is investment return because of the volatility of returns and the size of plan assets compared to payroll. A perusal of historical returns over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is to be expected, given the underlying capital market assumptions and the Plan's asset allocation. To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results.

A key demographic risk for the System is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect a margin for improvement in mortality experience and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, as we have recently seen with COVID-19, a public health crisis can result in a significant number of additional deaths in a short period of time, which can influence plan liabilities and future funding needs. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

Liquidation Risk

Under the revised Actuarial Standards of Practice (ASOP) No. 4 effective for valuations after February 15, 2023, we must now include a low-default-risk obligation measure of the System's liability in our funding valuation report. This is an informational disclosure as described below and would not be appropriate for assessing the funding progress or health of the plan.

This measure uses the unit credit cost method and reflects all the assumptions and provisions of the funding valuation except that the discount rate is derived from considering low-default-risk fixed income securities. We considered the FTSE Pension Discount Curve based on market bond rates published by the Society of Actuaries as of June 30, 2023 and with the 30-year spot rate used for all durations beyond 30. Using these assumptions, we calculate a liability of approximately \$ 4.0 billion.

This amount approximates the termination liability if the plan (or all covered employment) ended on the valuation date and all of the accrued benefits had to be paid with cash-flow matched bonds. This assurance of funded status and benefit security is typically more relevant for corporate plans than for governmental plans since governments rarely have the need or option to completely terminate a plan.





**VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES
AS OF JUNE 30, 2023**

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		\$1,688,328,166
Present Value of Future Member Contributions		\$205,543,006
Present Value of Future Employer Contributions		
Normal Contributions	25,654,411	
Unfunded Accrued Liability Contributions	<u>\$1,612,300,014</u>	
Total Prospective Employer Contributions		<u>\$1,637,954,425</u>
Total Present and Prospective Assets		<u>\$3,531,825,597</u>
ACTUARIAL LIABILITIES		
Present Value of Benefits Payable on Account of Retired Members and Survivors of Deceased Members Now Drawing Retirement Benefits		\$2,080,548,649
Present Value of Prospective Benefits Payable on Account of Inactive Members		\$83,830,137
Present Value of Prospective Benefits Payable on Account of Present Active Members:		
Service Retirement Benefits	\$1,311,445,028	
Disability Retirement Benefits	\$14,347,045	
Death Benefits	\$10,314,866	
Separation Benefits	<u>\$31,339,872</u>	
Total		<u>\$1,367,446,811</u>
Total Actuarial Liabilities		<u>\$3,531,825,597</u>





SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b – a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b – a) / (c))
6/30/2023	\$1,688,328,166	\$3,300,628,180	\$1,612,300,014	51.2%	\$389,396,542	414.1%
6/30/2022	1,650,222,049	3,308,098,964	1,657,876,915	49.9	396,438,088	418.2%
6/30/2021	1,573,957,130	3,307,928,535	1,733,971,405	47.6	392,498,511	441.8%
6/30/2020	1,453,148,609	3,326,755,832	1,873,607,223	43.7	406,675,782	460.7%
6/30/2019	1,385,992,022	3,236,419,538	1,850,427,516	42.8	428,085,691	432.3%
6/30/2018	1,401,187,212	3,207,632,525	1,806,445,313	43.7	453,802,083	398.1%

SUMMARY OF ASSUMPTIONS AND METHODS

Valuation Date	June 30, 2023
Actuarial Cost Method	Individual Entry Age Normal
Amortization Method	Level dollar, closed
Asset Valuation Method	5-Year Smoothed Market
Actuarial Assumptions:	
Investment rate of return*	6.75%
Projected salary increases*	3.50%
Cost-of-living adjustments	None
*Includes inflation at	2.50%



SCHEDULE B – DEVELOPMENT OF THE ACTUARIAL VALUE OF ASSETS



Valuation date June 30:	2019	2020	2021	2022	2023
A. Actuarial Value Beginning of Year	\$ 1,401,187,212	\$ 1,385,992,022	\$ 1,453,148,609	\$ 1,573,957,130	\$ 1,650,222,049
B. Market Value End of Year	1,403,702,320	1,459,232,314	1,772,586,869	1,554,402,617	1,609,705,074
C. Market Value Beginning of Year	1,408,375,956	1,403,702,320	1,459,232,314	1,772,586,869	1,554,402,617
Audit Adjustment	0	0	0	0	0
Adjusted Market Value Beginning of Year	1,408,375,956	1,403,702,320	1,459,232,314	1,772,586,869	1,554,402,617
D. Cash Flow					
D1. Contributions	108,111,563	195,662,930	189,510,018	192,909,404	174,514,929
D2. Benefit Payments	(207,822,961)	(218,289,504)	(220,632,884)	(222,313,724)	(224,558,638)
D3. Administrative Expenses	(3,750,583)	(3,639,007)	(3,578,199)	(3,721,056)	(4,728,772)
D4. Investment Expenses	0	0	0	0	0
D5. Net	(103,461,981)	(26,265,581)	(34,701,065)	(33,125,376)	(54,772,481)
E. Investment Income					
E1. Market Total: B.-C.-D5.	98,788,345	81,795,575	348,055,620	(185,058,876)	110,074,938
E2. Assumed Rate	6.75%	6.75%	6.75%	6.75%	6.75%
E3. Amount for Immediate Recognition	91,573,535	93,863,443	97,327,020	118,531,632	103,008,255
E4. Amount for Phased-In Recognition	7,214,810	(12,067,868)	250,728,600	(303,590,508)	7,066,683
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.20*E4.	1,442,962	(2,413,574)	50,145,720	(60,718,102)	1,413,337
F2. First Prior Year	2,401,657	1,442,962	(2,413,574)	50,145,720	(60,718,102)
F3. Second Prior Year	6,605,801	2,401,657	1,442,962	(2,413,574)	50,145,720
F4. Third Prior Year	(8,478,121)	6,605,801	2,401,657	1,442,962	(2,413,574)
F5. Fourth Prior Year	(5,279,043)	(8,478,121)	6,605,801	2,401,657	1,442,962
F6. Total Recognized Investment Gain	(3,306,744)	(441,275)	58,182,566	(9,141,337)	(10,129,657)
G. Actuarial Value End of Year:					
A.+D5.+E3.+F6.	\$ 1,385,992,022	\$ 1,453,148,609	\$ 1,573,957,130	\$ 1,650,222,049	\$ 1,688,328,166
H. Difference Between Market & Actuarial Val	\$ 17,710,298	\$ 6,083,705	\$ 198,629,739	\$ (95,819,432)	\$ (78,623,092)
I. Market Value Rate of Return	7.28%	5.88%	24.14%	(10.54)%	7.21%
J. Actuarial Value Rate of Return	6.54% ¹	6.80% ¹	10.83% ¹	7.02% ¹	5.72% ¹

¹ Reflects phase-in of 5-year "smoothed" market value of assets.



SCHEDULE C – SUMMARY OF NET CHANGES IN ASSETS



SUMMARY OF CHANGES IN NET ASSETS FOR THE YEAR ENDING JUNE 30, 2023

Additions for the Year		
Contributions		
Members	\$30,087,179	
University	\$142,491,428	
Other*	<u>\$1,936,322</u>	
Total		\$174,514,929
Net Investment Income		<u>\$110,074,938</u>
TOTAL		\$284,589,867
Deductions for the Year		
Benefit Payments		
	(\$224,558,638)	
Administrative Expenses	<u>(\$4,728,772)</u>	
TOTAL		(\$229,287,410)
Excess of Additions Over Deductions		
TOTAL		\$55,302,457
Reconciliation of Asset Balances		
Market Value of Assets as of June 30, 2022		\$1,554,402,617
Audit Adjustment		\$0
Excess of Additions over Deductions		\$55,302,457
Market Value of Assets as of June 30, 2023**		\$1,609,705,074

* Includes \$1,936,322 in retirement contributions due.

** The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B).



SCHEDULE D – OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS



INVESTMENT RATE OF RETURN: 6.75% per annum, compounded annually (net of investment expenses).

INFLATION ASSUMPTION: 2.50% per year.

ADMINISTRATIVE EXPENSE ASSUMPTION: Actual prior year expenses

PERCENT MARRIED: 80% of employees are assumed to be married, and wives are assumed to be the same age as their husbands.

ACTUARIAL METHOD: Individual Entry Age Normal cost method. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability. The unfunded actuarial accrued liability is amortized over a closed 30-year period beginning June 30, 2014. See Schedule E for a detailed explanation.

DECREMENTS:

- **PRE-RETIREMENT MORTALITY:** Pub 2010 Teachers Employees Below Median Amount-Weighted Mortality Table, projected generationally using scale MP-2021.
- **POST-RETIREMENT HEALTHY MORTALITY:** Pub 2010 Teachers Retirees Below Median Amount-Weighted Mortality Table, projected generationally using scale MP-2021.
- **POST-RETIREMENT DISABLED MORTALITY:** Pub 2010 Teachers Disabled Retirees Amount-Weighted Mortality Table.
- **BENEFICIARY MORTALITY:** Pub 2010 Teachers Below Median Amount-Weighted Contingent Survivors Mortality Table, projected generationally using scale MP-2021.



SCHEDULE D – OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS



- **DISABILITY:** Representative values are presented below (65% of the projected disabilities are assumed to be due to occupational causes).

Age	Men	Women
20	0.007%	0.007%
25	0.020%	0.020%
30	0.037%	0.037%
35	0.053%	0.053%
40	0.070%	0.070%
45	0.105%	0.105%
50	0.140%	0.140%
55	0.210%	0.210%
60	0.140%	0.140%

- **TERMINATION:** Assumed rates are presented below.

Years of Service	Rate
0	25.0%
1	22.0%
2	16.0%
3	11.5%
4	9.0%
5	7.0%
6	4.5%
7	4.0%
8	3.5%
9	3.0%
10	2.5%
11-15	2.0%
16+	1.0%





- **RETIREMENT:** Representative values are presented below.

Members with Less than 25 Years of Service as of July 1, 2015:

Age	Less than 30 Years of Service	30 or More Years of Service
45		6%
50		6%
55	4%	11%
58	4%	19%
60	4%	19%
61	4%	19%
62	4%	33%
63	10%	23%
64	10%	23%
65+	100%	100%

Members with 25 or More Years of Service as of July 1, 2015:

Age	Less than 30 Years of Service	30 or More Years of Service
45		15%
50		15%
55	3%	31%
58	3%	22%
60	3%	22%
61	3%	22%
62	15%	22%
63	15%	22%
64	15%	16%
65+	100%	100%



SCHEDULE D – OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS



ASSETS: The method of valuing assets is intended to recognize a “smoothed” market value of assets. Under this method, the difference between actual return on market value from investment experience and the expected return on market value is recognized over a 5-year period.

SALARY INCREASES: 3.50% per year, composed of price inflation rate of 2.50% plus real wage growth rate of 1.00%.



SCHEDULE E – ACTUARIAL COST METHOD



1. The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 6.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.
2. The employer contributions required to support the benefits of the System are determined using the individual entry age normal cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit.

The portion of the actuarial present value allocated to a valuation year is called the normal cost. The normal cost is calculated for each individual member. The normal cost rate is defined as the total of the individual normal cost divided by the total annual covered payroll.

The portion of the actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of assets and (b) the actuarial present value of future normal cost is called the Unfunded Actuarial Accrued Liability (UAAL). The UAAL is amortized as a level percentage of the projected salaries of the present and future members of the System, over a 30-year period beginning June 30, 2014 on a closed basis.



SCHEDULE F – SUMMARY OF PLAN PROVISIONS



1. Provisions applicable to those members who had completed 20 years of service by July 1, 1979 (Certification 7/7 Supplemented)

- a) Service retirement annuity payable:
 - i. After 30 years of service; or
 - ii. At age 58 after 10 years of service; or
 - iii. At age 55 after 25 years of service.
- b) Amount of service retirement annuity:
 - i. Before age 65 – member with at least 30 years of service: 75% of average compensation if age 55 at beginning date; 65% if under age 55. If member completed 30 years of service before July 1973, annuity is increased by 2% of average compensation for each year of service beyond 30 and before July 1973, but to not more than 85% of average compensation.
 - ii. Before age 65 – member with less than 30 years of service: 1.50% of average compensation per year of service for member with 20 or fewer years. Percentage increased by 0.05% for each year in excess of 20 years up to a maximum of 1.95% of average compensation per year of service. Amount reduced by ½% for each month member is under age 58 at time annuity begins.
 - iii. After age 65 – same as before age 65.
 - iv. Minimum annuity: \$250 per month.
 - v. Average compensation means the average for the highest-paid 36 months of service without limit on compensation.
 - vi. Employee contributions:
 - Complete supplementation: 7.00% of compensation.
 - Coordinated: 4.00% up to \$4,200 of compensation plus 6.50% of compensation in excess of \$4,200.



SCHEDULE F – SUMMARY OF PLAN PROVISIONS



2. **Provisions applicable to all members who were affected under Certification 37 and who had not completed 20 years of service by July 1, 1979 plus those members who entered the system on or after July 1, 1978 and who did not elect Certification 55 or 94 and did not elect full supplementation under Certification 54 (Certification 37/37 Coordinated)**
 - a) Service retirement annuity payable:
 - i. After 30 years of service and age 55; or
 - ii. At age 58 after 10 years of service; or
 - iii. At age 55 after 25 years of service.
 - b) Amount of service retirement annuity:
 - i. Before age 65 – member with at least 30 years of service: 75% of average compensation. Amount reduced by $\frac{1}{2}\%$ for each month member is under age 58 at time annuity begins.
 - ii. Before age 65 – member with less than 30 years of service: 1.50% of average compensation per year of service for member with 20 or fewer years. Percentage increased by 0.05% for each year in excess of 20 years up to a maximum of 1.95% of average compensation per year of service. Amount reduced by $\frac{1}{2}\%$ for each month member is under age 58 at time annuity begins.
 - iii. After age 65 – Benefit is coordinated. Annuity is reduced by $\frac{1}{2}\%$ of average compensation not in excess of the Social Security wage base in effect at retirement for each year of service up to 30 years. If member was under age 58 at beginning date, the coordination adjustment is made before application of $\frac{1}{2}\%$ reduction per month under 58.
 - iv. Minimum annuity: \$250 per month.
 - v. Average compensation means the average for the highest-paid 36 months of service, excluding that portion of compensation in any year which is in excess of \$35,000.
 - vi. Employee contributions for coordinated benefit: 5.00% of compensation up to maximum salary of \$35,000 for members with 25 or more years of service as of July 1, 2015, and 6.00% of compensation up to maximum



SCHEDULE F – SUMMARY OF PLAN PROVISIONS



salary of \$35,000 for members with less than 25 years of service as of July 1, 2015.

3. Provision applicable to all members who were affected by Certification 37 and who had not completed 20 years of service by July 1, 1979 as well as those members who entered the system on or after July 1, 1978 and later elected Certification 55 or those who elected full supplementation under Certification 54 (but not Certification 94) (Certification 55/55 Coordinated)

a) Service retirement annuity payable:

- i. After 30 years of service; or
- ii. At age 58 after 10 years of service; or
- iii. At age 55 after 25 years of service.

b) Amount of service retirement annuity:

- i. Before age 65 – member with at least 30 years of service: 75% of average compensation. Amount reduced by $\frac{1}{3}\%$ for each month member is under age 58 at time annuity begins if member had less than 25 years of service as of July 1, 2015 and reduced from age 55 for members with 25 or more years of service as of July 1, 2015.
- ii. Before age 65 – member with less than 30 years of service: 1.50% of average compensation per year of service for member with 20 or fewer years. Percentage increased by 0.05% for each year in excess of 20 years up to a maximum of 1.95% of average compensation per year of service. Amount reduced by $\frac{1}{3}\%$ for each month member is under age 58 at time annuity begins if member had less than 25 years of service as of July 1, 2015 and reduced from age 55 for members with 25 or more years of service as of July 1, 2015.
- iii. After age 65 – if member elected full supplementation, annuity is the same as before age 65. Otherwise, annuity is reduced by $\frac{1}{2}\%$ of average compensation at time of retirement multiplied by years of service up to 30 years.
- iv. Minimum annuity: \$250 per month.
- v. Average compensation means the average for the highest-paid 36 months of service, excluding that portion of compensation in any year which is in excess of \$35,000.



SCHEDULE F – SUMMARY OF PLAN PROVISIONS



- vi. Employee contributions:
 - 1. Complete supplementation: 7.00% of compensation up to \$35,000 for members with 25 or more years of service as of July 1, 2015.
 - 2. Complete supplementation: 8.00% of compensation up to \$35,000 for members with less than 25 years of service as of July 1, 2015.
 - 3. Coordinated: For members with 25 or more years of service as of July 1, 2015, 4% up to \$4,200 of compensation plus 6.50% of the excess up to the compensation limit of \$35,000. For members with less than 25 years of service as of July 1, 2015, 5% up to \$4,200 of compensation plus 6.50% of the excess up to the compensation limit of \$35,000.

4. For those entering between January 1, 1990 and June 30, 1998 who did not elect Certification 94 (Certification 55/55 Supplemented)

- a) Service retirement annuity payable:
 - i. After 30 years of service; or
 - ii. At age 58 after 10 years of service; or
 - iii. At age 55 after 25 years of service.
- b) Amount of service retirement annuity:
 - i. Before age 65 – member with at least 30 years of service: 75% of average compensation. Amount reduced by $\frac{1}{3}\%$ for each month member is under age 58 at time annuity begins if member had less than 25 years of service as of July 1, 2015 and reduced from age 55 for members with 25 or more years of service as of July 1, 2015.
 - ii. Before age 65 – member with less than 30 years of service: 1.50% of average compensation per year of service for member with 20 or fewer years. Percentage increased by 0.05% for each year in excess of 20 years up to a maximum of 1.95% of average compensation per year of service. Amount reduced by $\frac{1}{3}\%$ for each month member is under age 58 at time annuity begins if member had less than 25 years of service as of July 1, 2015 and reduced from age 55 for members with 25 or more years of service as of July 1, 2015.
 - iii. After age 65 – Same as before age 65.
 - iv. Minimum annuity: \$250 per month.



SCHEDULE F – SUMMARY OF PLAN PROVISIONS



- v. Average compensation means the average for the highest-paid 36 months of service, excluding that portion of compensation in any year which is in excess of \$35,000.
- vi. Employee contributions:
 - All completely supplemented: 8.00% of compensation up to compensation limit of \$35,000 for members with 25 or more years of service as of July 1, 2015.
 - All completely supplemented: 9.00% of compensation up to compensation limit of \$35,000 for members with less than 25 years of service as of July 1, 2015.

5. Certification 94

- a) Increase compensation up to \$50,000.
- b) Those electing coverage under the above certification agree to pay 9.00% of compensation up to \$50,000 for members with 25 or more years of service as of July 1, 2015, and 10.00% of compensation up to maximum salary of \$50,000 for members with less than 25 years of service as of July 1, 2015.

6. Certification 139

- a) Increase compensation up to a \$60,000 maximum. The \$60,000 cap was increased by 3.00% every two years until 7/1/2014. Effective 7/1/2014, the maximum compensation is frozen at \$69,557.
- b) Those electing coverage under the above certification agree to pay 11.00% of compensation up to the applicable indexed maximum for members with 25 or more years of service as of July 1, 2015, and 12% of compensation up to the applicable indexed maximum for members with less than 25 years of service as of July 1, 2015 (see (a) above).
- c) Effective July 1, 2015, all new employees will be covered under this certification and will pay 12.00% of compensation up to the applicable indexed maximum (see (a) above).





7. Disability Benefits

- a) A disability retirement annuity is payable upon:
- i. Disability due to occupational causes, regardless of service, or
 - ii. Disability due to non-occupational causes after 15 years of service. If member is also eligible for a service retirement annuity, benefit payable is the higher of the two.
- b) Amount of disability retirement annuity:
- i. Before age 65 – If service connected, 50% of rate of salary (subject to applicable salary cap) at retirement. If not service connected, 90% of the member's regular retirement benefit payable by the applicable retirement benefit formula above.
 - ii. After age 65 – Reduced to amount payable by the applicable retirement benefit formula above. However, if post 65 retirement benefit plus Primary Social Security benefit is less than pre 65 disability benefit, then post 65 benefit is adjusted (increased) by the amount necessary to match pre 65 disability benefit.
 - iii. Minimum annuity: \$250 per month.

8. Vested Benefits

A member whose employment terminates after ten (10) years of service, and who does not withdraw his contributions, receives a retirement annuity payable beginning at age 60 based on the applicable retirement formula above.

9. Non-vested Termination Benefits

If termination of employment occurs prior to completing ten (10) years of service, member is entitled only to a refund of his/her own contributions. Refund of a member's own contributions can also be obtained after attainment of ten (10) years of service but in that event the vested benefit is forfeited.

10. Pre-retirement Death Benefits

- a) A pre-retirement death benefit is payable upon:
- i. A service-connected death, or





ii. A non-service-connected death.

b) Amount of pre-retirement death benefit:

i. The widow of a deceased member whose death is service connected receives an annuity of 50% of final salary (subject to applicable salary cap), plus \$10 per month for each child under age 18 (21 if at school) or disabled. If no annuity is paid to widow, \$20 per month per eligible child. Widow receives annuity until death or remarriage. Maximum family benefit is 75% of final salary (subject to applicable salary cap).

If there is no surviving widow or eligible children, a lump sum amount equal to the member's contributions plus one year's final salary (subject to applicable salary cap), but not less than \$6,000, will be payable to the employee's designated beneficiary.

ii. Should the member's death be non-service connected then a lump sum amount is paid which is equal to the member's contributions plus one year's final salary (subject to applicable salary cap), but not less than \$6,000.

11. Post-retirement Death Benefits

Member contributions are refunded to the extent that they exceed retirement payments already made unless a reversionary annuity was elected. Minimum payment is \$600. In addition, 50% of retirement annuity is payable to the surviving spouse until death, remarriage, or until the spouse begins to receive Social Security benefits. Minimum annuity, \$75 per month; maximum annuity, \$150 per month.

12. Reversionary Annuity

Member may elect to receive a reduced annuity in order to provide a lifetime benefit after death to a spouse or relative. The benefit to the spouse or relative may be as low as \$25 per month or as high as 100% of the member's reduced annuity. This option is not permitted if member retires on a disability annuity.

13. Christmas Bonus

A \$400 annual bonus is given to all retired participants.



SCHEDULE G – SCHEDULE OF ACTIVE MEMBER DATA



SCHEDULE OF ACTIVE MEMBER DATA AS OF JUNE 30, 2023

Age	Completed Years of Service							Total	Payroll
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+		
Under 20	2	0	0	0	0	0	0	2	72,715
20 to 24	91	0	0	0	0	0	0	91	1,724,670
25 to 29	248	22	0	0	0	0	0	270	5,565,961
30 to 34	193	115	22	0	0	0	0	330	9,161,346
35 to 39	218	135	111	33	1	0	0	498	18,574,067
40 to 44	149	184	142	265	98	1	0	839	34,173,901
45 to 49	119	132	131	313	403	112	1	1,211	53,754,471
50 to 54	116	87	95	240	369	426	76	1,409	67,498,758
55 to 59	84	76	63	176	331	415	264	1,409	72,935,326
60 to 64	49	35	32	121	197	337	295	1,066	62,138,083
65 to 69	12	13	22	43	82	113	214	499	33,261,898
70+	7	10	7	32	32	60	257	405	30,535,346
Total	1,288	809	625	1,223	1,513	1,464	1,107	8,029	389,396,542

Average Active Age: 51.5

Average Service: 18.7



SCHEDULE G – SCHEDULE OF ACTIVE MEMBER DATA



DISTRIBUTION OF ACTIVE PARTICIPANTS BY PENSION ELIGIBILITY, CONTRIBUTORY MAXIMUM, AND PLAN TYPE

Pension Eligibility Certification	Contributory Maximum Certification	Employee Contribution Wage Base	Plan Type	Participant Count @ 6/30/2023	Participant Count @ 6/30/2022
Cert. #55	Cert. #55	None	Coordinated	1	1
Cert. #55	Cert. #55	\$35,000	Coordinated	19	20
Cert. #37	Cert. #37	\$35,000	Coordinated	224	264
Cert. #55	Cert. #55	\$35,000	Supplemented	195	232
Cert. #7	Cert. #7	None	Supplemented	-	-
Cert. #37	Cert. #94	\$50,000	Coordinated	27	32
Cert. #55	Cert. #94	\$50,000	Supplemented	114	211
Cert. #55	Cert. #94	\$50,000	Coordinated	4	4
Cert. #37	Cert. #139*	\$69,557	Coordinated	27	32
Cert. #55	Cert. #139*	\$69,557	Coordinated	1	1
Cert. #55	Cert. #139*	\$69,557	Supplemented	123	168
Cert. #37/ Cert. #140	Cert. #37	\$35,000	Coordinated	24	26
Cert. #55/ Cert. #140	Cert. #55	\$35,000	Supplemented	1,084	1,168
Cert. #37/ Cert. #140	Cert. #94	\$50,000	Coordinated	4	5
Cert. #55/ Cert. #140	Cert. #94	\$50,000	Supplemented	3,015	3,074
Cert. #55/ Cert. #140	Cert. #94	\$50,000	Coordinated	9	11
Cert. #37/ Cert. #140	Cert. #139*	\$69,557	Coordinated	3	3
Cert. #55/ Cert. #140	Cert. #139*	\$69,557	Coordinated	5	5
Cert. #55/ Cert. #140	Cert. #139*	\$69,557	Supplemented	3,150	3,047
				8,029	8,304

*Effective 7/1/2014, the Certification 139 contribution wage base is frozen at \$69,557.



SCHEDULE H – DATA RECONCILIATION



DATA RECONCILIATION AS OF JUNE 30, 2023

	Active	Terminated Vested	Receiving Benefits	Total
1. Number of Participants as of June 30, 2022	8,304	578	9,390	18,272
2. Change in status during the plan year:				
a. Active to inactive	(100)	100		
b. Active to retiree	(287)		287	
c. Inactive to active	27	(27)		
d. Inactive to retired		(6)	6	
e. Retired to active				
3. No longer participating due to:				
a. Death	(5)		(309)	(314)
b. Termination / Refund	(381)	(48)		(429)
c. Deletion of duplicate data				
d. Benefit suspended			(8)	(8)
4. New participant due to:				
a. Initial participation	355			355
b. Omitted in error last year				
c. Pickups and Corrections	116	4	9	129
d. New beneficiaries			4	4
5. Number of Participants as of June 30, 2023	8,029	601	9,379	18,009



SCHEDULE I – ESTIMATED BENEFIT PAYMENTS



ESTIMATED PROJECTED BENEFIT PAYMENTS*

<u>Year End</u>	<u>Current In-Pay</u>	<u>Current Not-In-Pay</u>	<u>Total</u>
2024	\$222,764,636	\$28,525,667	\$251,290,303
2025	217,545,163	36,259,016	253,804,179
2026	212,058,683	43,736,243	255,794,926
2027	206,328,668	51,766,522	258,095,190
2028	200,555,333	59,501,677	260,057,010
2029	194,639,907	66,974,128	261,614,035
2030	188,577,835	74,463,818	263,041,653
2031	182,391,420	82,307,153	264,698,573
2032	176,046,267	89,582,687	265,628,954
2033	169,533,348	96,949,078	266,482,426
2034	162,879,232	103,854,653	266,733,885
2035	156,052,765	110,680,017	266,732,782
2036	149,067,289	116,764,957	265,832,246
2037	141,916,837	122,779,921	264,696,758
2038	134,683,297	127,991,675	262,674,972
2039	127,330,124	132,464,677	259,794,801
2040	119,872,910	136,578,468	256,451,378
2041	112,369,861	139,747,467	252,117,328
2042	104,868,080	142,269,413	247,137,493
2043	97,356,395	144,236,842	241,593,237
2044	89,905,291	145,547,078	235,452,369
2045	82,553,979	146,536,067	229,090,046
2046	75,388,249	146,835,213	222,223,462
2047	68,422,614	146,853,368	215,275,982
2048	61,713,877	146,219,062	207,932,939

*Amounts shown are the cash flows for current members only, based on the current benefit structure and assuming that all actuarial assumptions are met each year. To the extent that actual experience deviates from that expected, results will vary. Amounts are shown in future nominal dollars and have not been discounted to the valuation date. Does not include refunds to current non-vested inactive members.

