

City of New Orleans Employees' Retirement System

Actuarial Valuation and Review as of January 1, 2022



This report has been prepared at the request of the Board of Trustees to assist in administering the System. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Trustees and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

© 2022 by The Segal Group, Inc. All rights reserved.

Segal



2727 Paces Ferry Road SE, Building One Suite 1400
Atlanta, GA 30339-4053
segalco.com
T 678.306.3100

August 11, 2022

Board of Trustees
City of New Orleans Employees' Retirement System
1300 Perdido Street, Suite 1E12
New Orleans, LA 70112

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2022. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal 2022.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the System. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Jeffrey S. Williams. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,
Segal

A handwritten signature in black ink that reads "Jeffrey S. Williams".

Jeffrey S. Williams, FCA, ASA, MAAA
Vice President and Consulting Actuary
Enrolled Actuary No. 20-7009

Table of Contents

Section 1: Actuarial Valuation Summary	4
Purpose and basis.....	4
Valuation highlights.....	5
Summary of key valuation results	7
Important information about actuarial valuations.....	8
Section 2: Actuarial Valuation Results.....	10
Participant data.....	10
Actuarial experience	17
Actuarially determined contribution	21
Schedule of funding progress through December 31, 2021	23
Risk	25
GFOA funded liability by type	27
Section 3: Supplemental Information.....	29
Exhibit A: Table of Plan Demographics.....	29
Exhibit B: Participants in Active Service as of December 31, 2021 by Age, Years of Service, and Average Payroll.....	30
Exhibit C: Reconciliation of Participant Data	31
Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis	32
Exhibit E: Summary Statement of Plan Assets.....	33
Exhibit F: Development of the Fund through December 31, 2021	34
Exhibit G: Table of Amortization Bases.....	35
Exhibit H: Definition of Pension Terms.....	36
Section 4: Actuarial Valuation Basis.....	40
Exhibit I: Actuarial Assumptions and Actuarial Cost Method	40
Exhibit II: Summary of Plan Provisions	43

Section 1: Actuarial Valuation Summary

Purpose and basis

This report was prepared by Segal to present a valuation of the System as of January 1, 2022. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations. 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; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of December 31, 2021, provided by the Administrative Office;
- The assets of the Plan as of December 31, 2021, provided by the Administrative Office;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. and
- The funding policy adopted by the System and the employers.

Certain disclosure information required by GASB Statements No 67 and 68 as of December 31, 2021 for the System is provided in a separate report.

Section 1: Actuarial Valuation Summary

Valuation highlights

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy adopted by the City meets this standard.
2. The actuarially determined contribution (ADC) for the upcoming year is \$24,450,297, an increase of \$476,929 from last year. The contributions as a percentage of payroll decreased from 17.66% of payroll to 17.18% of payroll.
3. Actual contributions made during the fiscal year ending December 31, 2021 were \$21,651,850, 90.32% of the actuarially determined contribution (ADC). In the prior fiscal year, actual contributions were \$32,615,183, 142.48% of the prior year ADC.
4. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 59.59%, compared to the prior year funded ratio of 58.84%. This ratio is one measure of funding status, and its history is a measure of funding progress. Using the market value of assets, the funded ratio is 65.91%, compared to 61.72% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of the System assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
5. The unfunded actuarial accrued liability is \$312.7 million, which is an increase of \$5.5 million since the prior valuation.
6. The actuarial loss from investment and other experience is \$11,694,925, or 1.51% of actuarial accrued liability.
7. The net experience loss from sources other than investment experience was 1.95% of the actuarial accrued liability. This gain/loss was primarily due to data adjustments provided by the System.
8. The rate of return on the market value of assets was 15.77% for the January 1, 2021 to December 31, 2021 Plan Year. The return on the actuarial value of assets was 8.12% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial gain when measured against the assumed rate of return of 7.25%. This actuarial investment gain decreased the average employer contribution rate by 0.2% of pay. Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various classes, we advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.25%.
9. The actuarial value of assets is 90.41% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net gain is recognized in future years, the cost of the Plan is likely to decrease unless the net gain is offset by future experience. The recognition of the market gains of \$48,937,213 will also have an impact on the future funded ratio. If the net deferred gains were recognized immediately in the actuarial value of assets, the ADC would decrease from 17.18% to about 14.94% of payroll.

Section 1: Actuarial Valuation Summary

10. With this valuation, the Board has elected to adopt a 5-year straight line amortization of investment gains and losses for the purpose of the actuarial value of assets. Previously, the System had used a seven-year smoothing period which reflected the actual cash flow and adjusted for each prior year's market value to the current valuation date using the actuarial interest assumption in effect for each of the seven years. The asset method was implemented as if it had been in effect for the past five years, recognizing prior years' market value asset gains and losses. As a result of this asset method change, the unfunded actuarial accrued liability decreased by \$8,717,521. The total impact was a decrease in the ADC of \$569,647, or 0.4% of payroll.
11. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the Plan and employer's financial statements as of December 31, 2021, will be provided separately.
12. It is important to note that this actuarial valuation is based on plan assets as of December 31, 2021. Due to the COVID-19 pandemic, market conditions have changed significantly since the onset of the Public Health Emergency. The Plan's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the plan year. Moreover, this actuarial valuation does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after December 31, 2021. While it is impossible to determine how the pandemic will affect market conditions and other demographic experience of the Plan in future valuations, Segal is available to prepare projections of potential outcomes upon request.
13. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the System's future financial condition but have included a brief discussion of some risks that may affect the System in *Section 2*. A more detailed assessment would provide the Board with a better understanding of the inherent risks.

Section 1: Actuarial Valuation Summary

Summary of key valuation results

		2022	2021
Contributions for plan year beginning January 1:	• Actuarially determined employer contributions	\$24,450,297	\$23,973,368
	• Actuarially determined employer contributions as a percent of payroll	17.18%	17.66%
	• Actual employer contributions	--	21,651,850
Actuarial accrued liability for plan year beginning January 1:	• Retired participants and beneficiaries	\$481,485,234	\$484,891,096
	• Inactive vested participants	34,152,546	21,045,092
	• Active participants	258,186,299	240,404,134
	• Total actuarial accrued liability	773,824,079	746,340,322
	• Total normal cost including administrative expenses	11,620,167	11,606,866
Assets for plan year beginning January 1:	• Market value of assets (MVA)	\$510,029,851	\$460,642,035
	• Actuarial value of assets (AVA)	461,092,638	439,149,127
	• Actuarial value of assets as a percentage of market value of assets	90.41%	95.33%
Funded status for plan year beginning January 1:	• Unfunded actuarial accrued liability on market value of assets	\$263,794,228	\$285,698,287
	• Funded percentage on MVA basis	65.91%	61.72%
	• Unfunded actuarial accrued liability on actuarial value of assets	\$312,731,441	\$307,191,195
	• Funded percentage on AVA basis	59.59%	58.84%
Demographic data for plan year beginning January 1:	• Number of retired participants and beneficiaries	2,134	2,151
	• Number of inactive vested participants	376	314
	• Number of active participants	2,693	2,648
	• Total payroll	\$142,338,647	\$135,779,772
	• Average payroll	52,855	51,276

Section 1: Actuarial Valuation Summary

Important information about actuarial valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the City. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by the City. The City uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results that does not mean that the previous assumptions were unreasonable.
Models	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.

An actuarial valuation is a measurement of the Plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the Plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plan.

Actuarial results in this report are not rounded, but that does not imply precision.

If the Board is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the Plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

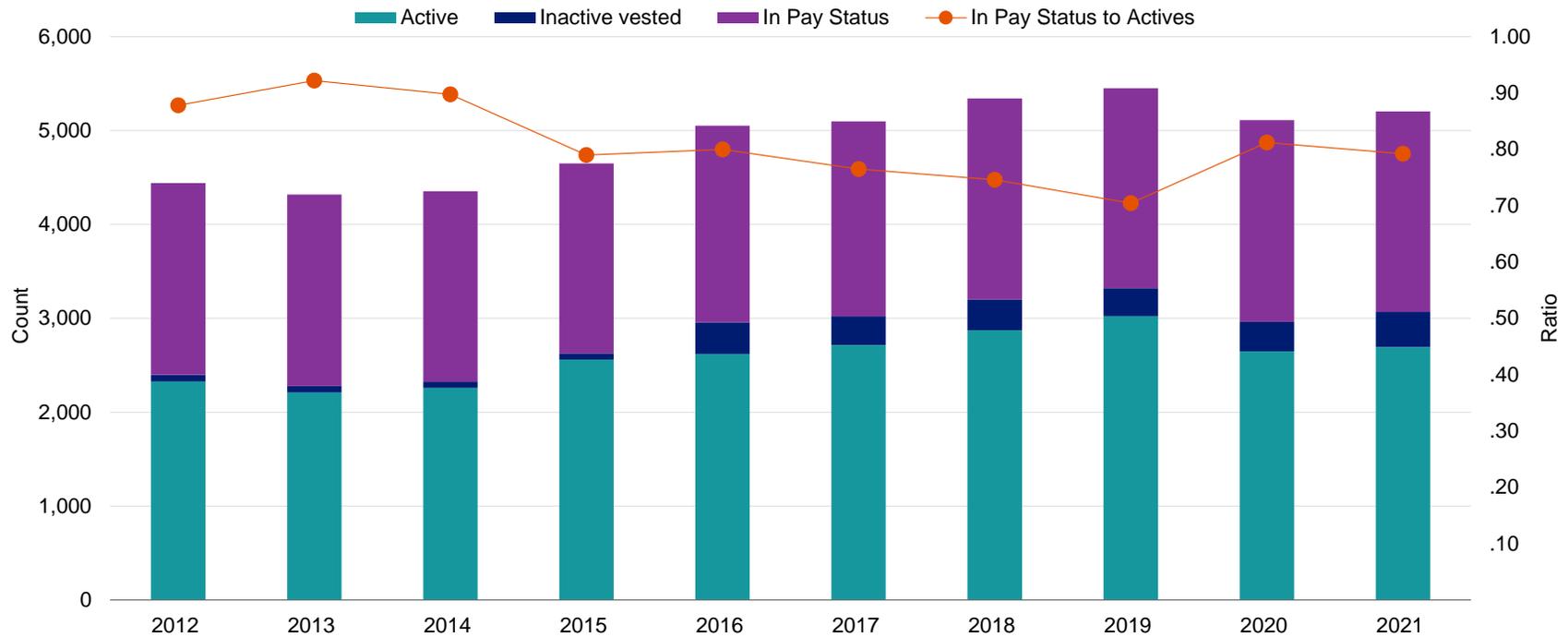
As Segal has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

Section 2: Actuarial Valuation Results

Participant data

This section presents a summary of significant statistical data on covered participants.

Participant Population: 2012 – 2021



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
In Pay Status	2,044	2,039	2,028	2,024	2,096	2,078	2,143	2,130	2,151	2,134
Inactive Vested ¹	71	68	66	65	337	303	328	298	314	376
Active	2,327	2,211	2,259	2,562	2,620	2,716	2,873	3,024	2,648	2,693
Ratio	0.88	0.92	0.90	0.79	0.80	0.77	0.75	0.70	0.81	0.79

¹ Excludes terminated participants due a refund of employee contributions

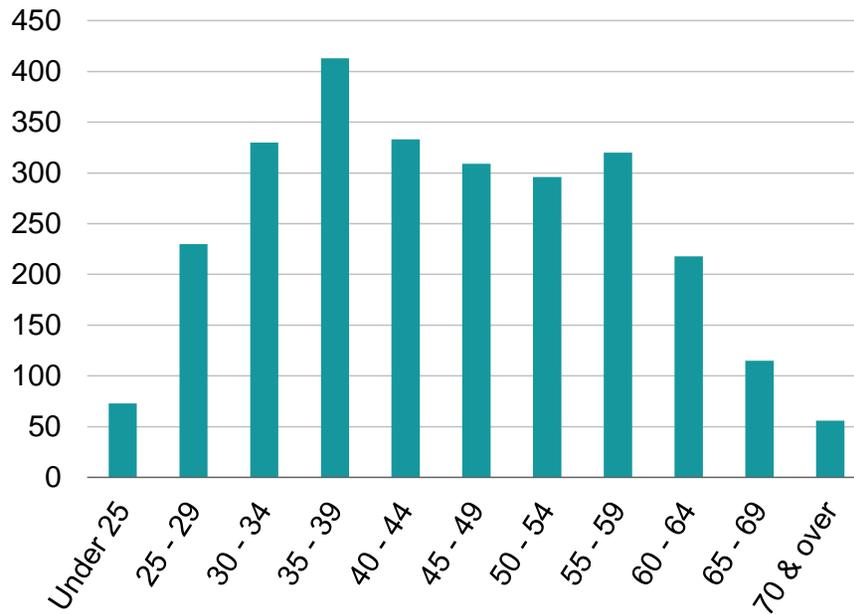
Section 2: Actuarial Valuation Results

Active participants

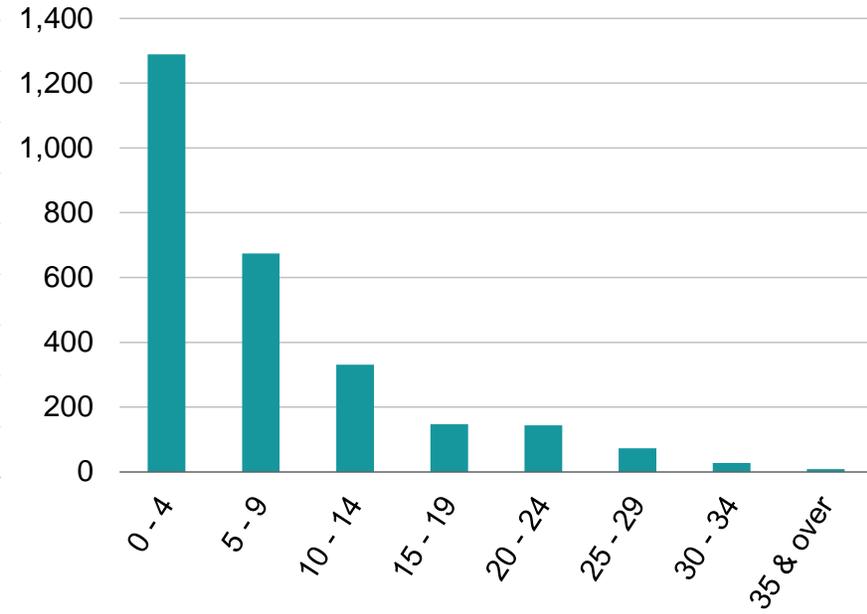
As of December 31,	2021	2020	Change
Active participants	2,693	2,648	1.7%
Average age	45.4	45.1	0.3
Average years of service	7.8	7.8	–
Average compensation	52,855	51,276	3.1%

Distribution of Active Participants as of December 31, 2021

Actives by Age



Actives by Years of Service



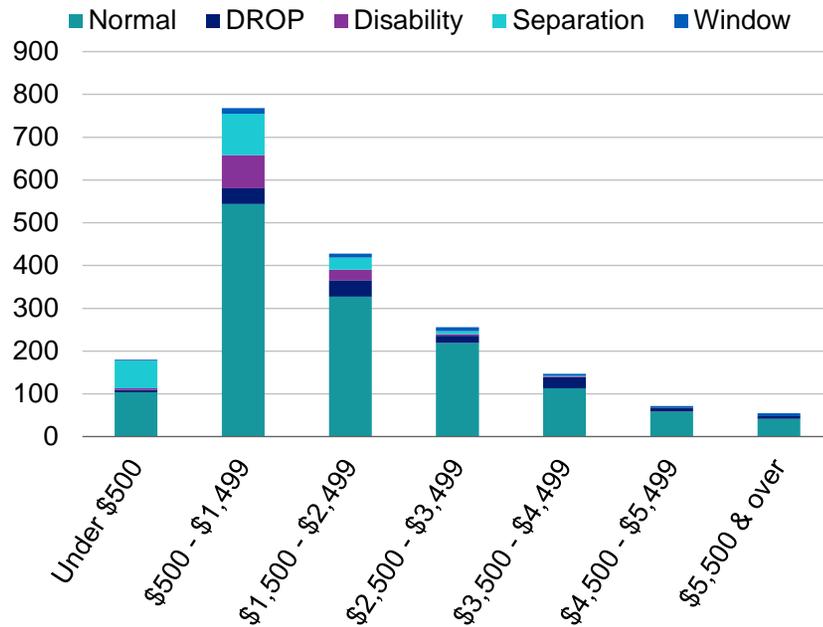
Section 2: Actuarial Valuation Results

Retired participants and beneficiaries

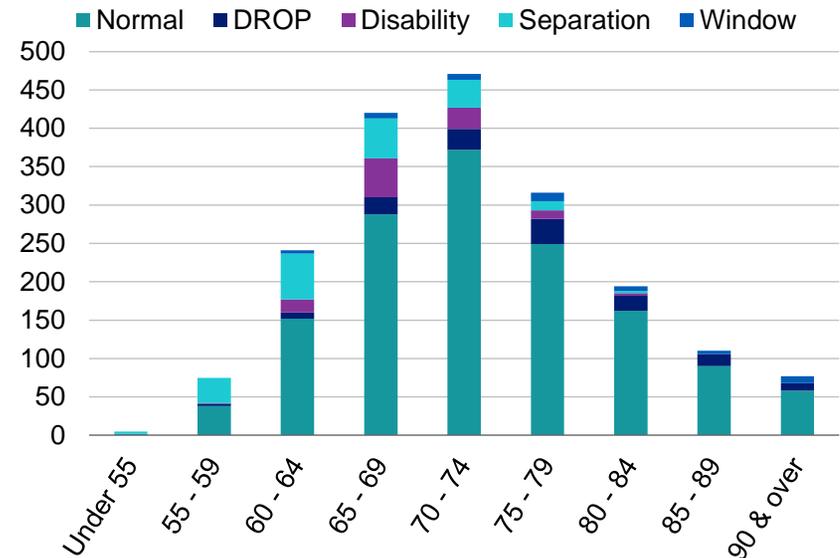
As of December 31,	2021	2020	Change
Retirees	1,908	1,939	-1.6%
Beneficiaries	226	212	6.6%
Average age	73.2	71.9	1.3
Average amount	\$1,880	\$1,848	1.7%
Total monthly amount	\$4,011,380	\$3,974,632	0.9%

Distribution of Retired Participants as of December 31, 2021

Retired Participants by Type and Monthly Amount



Retired Participants by Type and Age



Section 2: Actuarial Valuation Results

Historical plan population

Participant Data Statistics: 2012 – 2021

Year Ended December 31	Active Participants			Retired Participants and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2012	2,327	45.3	9.4	2,044	71.0	\$1,521
2013	2,211	45.0	9.4	2,039	71.3	1,557
2014	2,259	44.4	8.6	2,028	71.4	1,617
2015	2,562	44.0	8.3	2,024	71.8	1,629
2016	2,620	44.0	7.8	2,096	71.7	1,707
2017	2,716	44.1	7.5	2,078	72.3	1,758
2018	2,873	44.2	7.3	2,143	72.0	1,770
2019	3,024	44.4	6.3	2,130	72.3	1,808
2020	2,648	45.1	7.8	2,151	72.7	1,848
2021	2,693	45.4	7.8	2,134	73.2	1,880

Note: Average age, service, and monthly amounts prior to 2018 are estimated based on valuation reports from the prior actuary.

Section 2: Actuarial Valuation Results

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

Determination of Actuarial Value of Assets for Year Ended December 31, 2021

1	Market value of assets, December 31, 2021				\$510,029,851
2	Calculation of unrecognized return	Original Amount¹	Percent Deferred²	Unrecognized Amount³	
	(a) Year ended December 31, 2021	\$38,336,192	80%	\$30,668,954	
	(b) Year ended December 31, 2020	24,087,406	60%	14,452,443	
	(c) Year ended December 31, 2019	31,830,992	40%	12,732,396	
	(d) Year ended December 31, 2018	-44,582,900	20%	-8,916,580	
	(e) Year ended December 31, 2017	25,899,133	0%	0	
	(f) Total unrecognized return				\$48,937,213
3	Preliminary actuarial value: (1) - (2f)				461,092,638
4	Adjustment to be within 30% corridor				0
5	Final actuarial value of assets as of December 31, 2021: (3) + (4)				<u>461,092,638</u>
6	Actuarial value as a percentage of market value: (5) ÷ (1)				90.4%
7	Amount deferred for future recognition: (1) - (5)				\$48,937,213

¹ Total return minus expected return on a market value basis

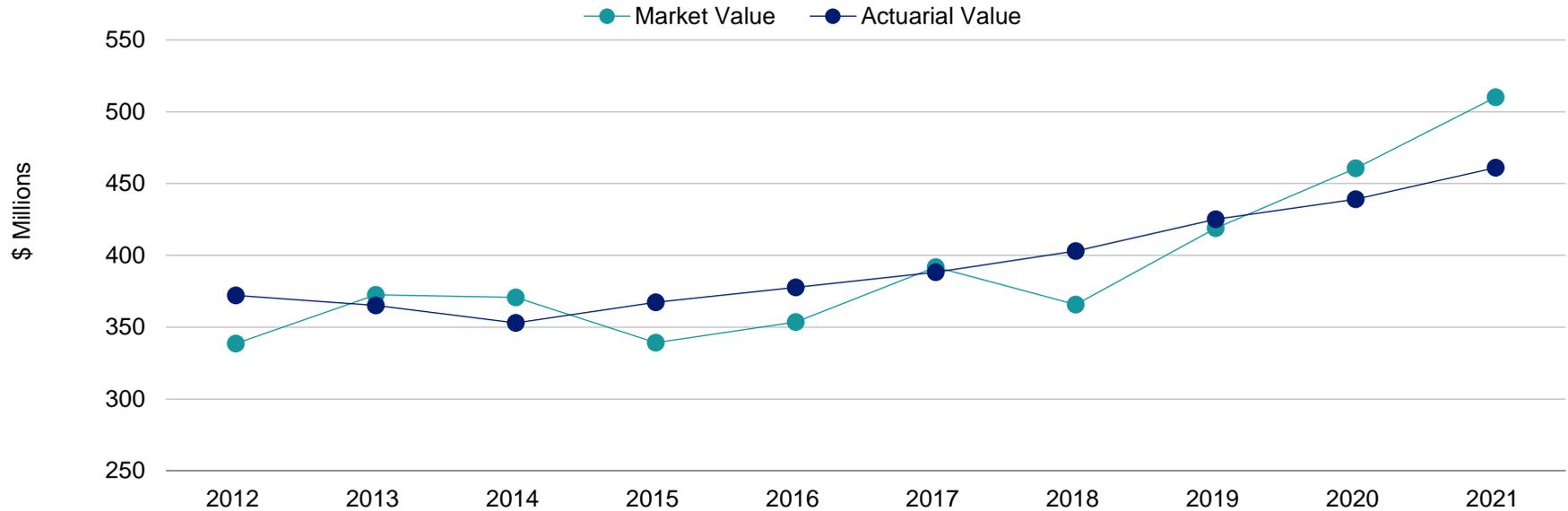
² Percent deferred applies to the current valuation year

³ Recognition at 20% per year over five years

Section 2: Actuarial Valuation Results

Both the actuarial value and market value of assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

Market Value of Assets vs. Actuarial Value of Assets



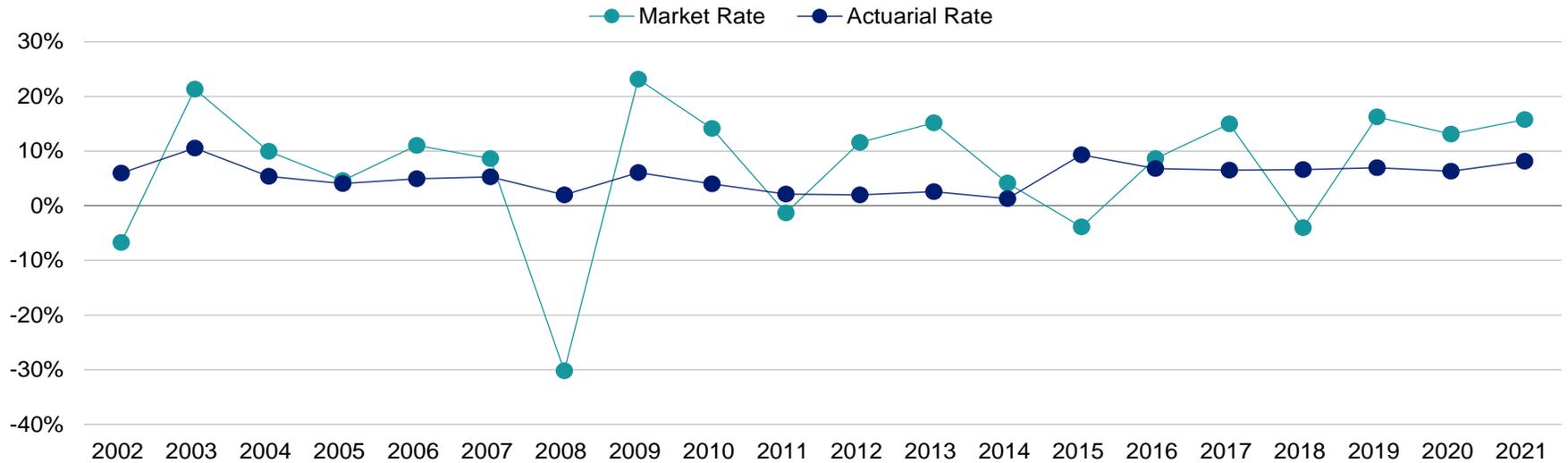
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Market Value ¹	\$338.61	\$372.46	\$370.75	\$339.10	\$353.61	\$391.83	\$365.74	\$418.97	\$460.64	\$510.03
Actuarial Value ¹	372.05	365.10	352.92	367.27	377.75	388.23	403.02	425.08	439.15	461.09

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 20 years, including averages over select time periods. As described earlier in this section, the actuarial asset valuation method gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

¹ In \$ millions

Section 2: Actuarial Valuation Results

Market and Actuarial Rates of Return for Years Ended December 31, 2002 - 2021



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Market rate	-6.7%	21.3%	9.9%	4.6%	11.0%	8.6%	-30.2%	23.1%	14.1%	-1.3%	11.6%	15.2%	4.2%	-3.9%	8.6%	15.0%	-4.0%	16.3%	13.1%	15.8%
Actuarial rate	6.0%	10.6%	5.4%	4.0%	4.9%	5.3%	2.0%	6.1%	4.0%	2.1%	2.0%	2.6%	1.3%	9.3%	6.8%	6.5%	6.6%	7.0%	6.3%	8.1%

Average Rates of Return	Actuarial Value	Market Value
Most recent five-year average return:	7.13%	11.25%
Most recent ten-year average return:	5.81%	9.19%
Most recent fifteen-year average return:	5.17%	6.50%
20-year average return:	5.41%	6.81%

Section 2: Actuarial Valuation Results

Actuarial experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), any contribution requirement will decrease from the previous year. On the other hand, any contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience. If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

Actuarial Experience for Year Ended December 31, 2021

1	Net gain from investments ¹	\$3,732,602
2	Net loss from administrative expenses	-318,626
3	Net loss from other experience	-15,108,901
4	Net experience loss: 1 + 2 + 3	-\$11,694,925

¹ Details on next page

Section 2: Actuarial Valuation Results

Investment experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the market value of assets was 15.77% for the year ended December 31, 2021.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. The actual rate of return on an actuarial basis for the 2021 Plan Year was 8.12%. Since the actual return for the year was greater than the assumed return, the Plan experienced an actuarial gain during the year ended December 31, 2021 with regard to its investments.

Investment Experience

		Year Ended December 31, 2021	
		Market Value	Actuarial Value
1	Net investment income	\$70,951,072	\$34,789,246
2	Average value of assets	449,860,407	428,367,499
3	Rate of return: $1 \div 2$	15.77%	8.12%
4	Assumed rate of return	7.25%	7.25%
5	Expected investment income: 2×4	32,614,880	31,056,644
6	Actuarial gain/(loss): $1 - 5$	<u>\$38,336,192</u>	<u>\$3,732,602</u>

Section 2: Actuarial Valuation Results

Non-investment experience

Administrative expenses

- Administrative expenses for the year ended December 31, 2021 totaled \$560,127, as compared to the assumption of \$263,040.

Other experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended December 31, 2021 amounted to \$15,108,902, which is 2.0% of the actuarial accrued liability. The primary source of this loss is due to data adjustments provided for this valuation, specifically terminated vested participants and retirees that were not previously valued.

Actuarial assumptions

There are no assumption changes reflected in this report

Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan provisions

There were no changes in plan provisions since the prior valuation.

A summary of plan provisions is in *Section 4, Exhibit II*.

Section 2: Actuarial Valuation Results

Development of Unfunded Actuarial Accrued Liability for Year Ended December 31, 2021

1	Unfunded actuarial accrued liability at beginning of year		\$307,191,195
2	Total normal cost at beginning of year		11,606,866
3	Total contributions		-31,126,508
4	Interest on 1, 2 & 3		22,082,484
5	Expected unfunded actuarial accrued liability		\$309,754,037
6	Changes due to:		
	(a) (Gain)/loss	11,694,925	
	(b) Assumptions	0	
	(c) Funding method	-8,717,521	
	(d) Plan provisions	0	
	Total changes		<u>\$2,977,404</u>
7	Unfunded actuarial accrued liability at end of year		<u>\$312,731,441</u>

Section 2: Actuarial Valuation Results

Actuarially determined contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. As of January 1, 2022, the actuarially determined contribution is \$24,450,297, or 17.18% of payroll.

The contribution requirement as of January 1, 2022 is based on the data previously described, the actuarial assumptions and plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

Actuarially Determined Contribution for Year Beginning January 1

	2022		2021	
	Amount	% of Payroll	Amount	% of Payroll
1 Total normal cost	\$11,335,490	7.96%	\$11,335,306	8.35%
2 Administrative expenses	284,677	0.20%	271,560	0.20%
3 Expected employee contributions	<u>-8,540,319</u>	<u>-6.00%</u>	<u>-8,146,786</u>	<u>-6.00%</u>
4 Employer normal cost: (1) + (2) + (3)	\$3,079,848	2.16%	\$3,460,079	2.55%
5 Actuarial accrued liability	\$773,824,079		\$746,340,322	
6 Actuarial value of assets	<u>461,092,638</u>		<u>439,149,127</u>	
7 Unfunded actuarial accrued liability: (5) - (6)	\$312,731,441		\$307,191,195	
8 Payment on unfunded actuarial accrued liability	21,370,449	15.01%	20,513,289	15.11%
9 Actuarially determined contribution: (4) + (8)	<u>\$24,450,297</u>	<u>17.18%</u>	<u>\$23,973,368</u>	<u>17.66%</u>
10 Payroll	\$142,338,647		\$135,779,772	

Section 2: Actuarial Valuation Results

Reconciliation of actuarially determined contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

Reconciliation of Actuarially Determined Contribution from January 1, 2021 to January 1, 2022

		Amount	% of Payroll
1	Actuarially Determined Contribution as of January 1, 2021	\$23,973,368	17.66%
2	Effect of change in asset method	-569,647	-0.42%
3	Effect of expected change in amortization payment due to payroll growth	512,832	0.38%
4	Effect of investment gain	-243,907	-0.18%
5	Effect of other gains and losses on accrued liability	1,008,113	0.74%
6	Net effect of other changes, including composition and number of participants	-230,462	-0.16%
7	Total change	\$476,929	0.36%
8	Total change in percentage due to compensation change		-0.84%
9	Actuarially Determined Contribution as of January 1, 2022	\$24,450,297	17.18%

Section 2: Actuarial Valuation Results

Schedule of funding progress through December 31, 2021

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)
01/01/2019	\$403,015,342	\$658,352,626	\$255,337,284	61.22%	\$128,530,078	198.66%
01/01/2020	425,079,078	723,145,441	298,066,363	58.78%	149,538,039	199.32%
01/01/2021	439,149,127	746,340,322	307,191,195	58.84%	135,779,772	226.24%
01/01/2022	461,092,638	773,824,079	312,731,441	59.59%	142,338,647	219.71%

Section 2: Actuarial Valuation Results

History of employer contributions

A history of the most recent years of contributions is shown below.

History of Employer Contributions: 2013 – 2022

Fiscal Year Ended December 31	Actuarially Determined Employer Contribution (ADC)		Actual Employer Contribution		
	Amount	Percentage of Payroll	Amount	Percentage of Payroll	Percent Contributed
2013	\$20,228,129	21.78%	\$18,544,682	19.97%	91.68%
2014	20,871,424	22.58%	20,306,887	21.97%	97.30%
2015	21,891,996	22.51%	22,447,281	23.08%	102.54%
2016	22,713,296	21.49%	27,304,527	25.83%	120.21%
2017	26,857,512	23.25%	27,169,921	23.52%	101.16%
2018	28,015,495	23.19%	31,065,227	25.71%	110.89%
2019	28,689,759	22.32%	33,884,678	26.36%	118.11%
2020	22,890,640	15.31%	32,615,183	21.81%	142.48%
2021	23,973,368	17.66%	21,651,850	15.95%	90.32%
2022	24,450,297	17.18%	--	--	--

Section 2: Actuarial Valuation Results

Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Plan. A more detailed assessment would provide the Trustees with a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing and stochastic modeling.

- Investment Risk (the risk that returns will be different than expected)

If the actual return on market value for the next plan year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by 0.2%, or about \$600,000.

Since the Plan's assets are much larger than contributions, investment performance may create volatility in contribution requirements. For example, for each 1% difference in return from the assumed return, the actuarially determined contribution would change by \$375,000 (0.26% of payroll).

The market value rate of return over the last 20 years has ranged from a low of -30.18% to a high of 23.13%.

- Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

- Contribution Risk (the risk that actual contributions will be different from actuarially determined contribution)

The Plan's funding policy requires payment of the actuarially determined contribution. As long as this policy is adhered to, contribution risk is negligible.

- Demographic Risk (the risk that participant experience will be different than assumed)

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active participant turnover than assumed.

- Actual Experience Over the Last 5 years and Implications for the Future

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past five years:

Section 2: Actuarial Valuation Results

The non-investment gain(loss) for a year has ranged from a loss of \$23,462,607 to a gain of \$14,885,424.

The funded percentage on the actuarial value of assets has ranged from a low of 58.8% to a high of 61.2% since 2018.

- Maturity Measures

As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities.

Currently the Plan has a non-active to active participant ratio of 0.93. For the prior year benefits and administrative expenses paid were \$21,563,256 more than contributions received. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 2: Actuarial Valuation Results

GFOA funded liability by type

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the Plan's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent.

GFOA Funded Liability by Type as of December 31

	2022	2021
Actuarial accrued liability (AAL)		
• Active member contributions	\$54,590,311	\$52,073,173
• Retirees and beneficiaries	481,485,234	484,891,096
• Active and inactive members (employer-financed)	237,748,534	209,376,053
Total	\$773,824,079	\$746,340,322
Actuarial value of assets	\$461,092,638	\$439,149,127
Cumulative portion of AAL covered		
• Active member contributions	100.00%	100.00%
• Retirees and beneficiaries	84.43%	79.83%
• Active and inactive members (employer-financed)	0.00%	0.00%

Section 2: Actuarial Valuation Results

Actuarial balance sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the "liability" of the Plan.

Second, this liability is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

Actuarial Balance Sheet

	Year Ended	
	December 31, 2021	December 31, 2020
Liabilities		
• Present value of benefits for retired participants and beneficiaries	\$481,485,234	\$484,891,096
• Present value of benefits for inactive vested participants	34,152,546	21,045,092
• Present value of benefits for active participants	<u>329,772,261</u>	<u>312,052,491</u>
Total liabilities	\$845,410,041	\$817,988,679
Assets		
• Total valuation value of assets	\$461,092,638	\$439,149,127
• Present value of future contributions by members	53,217,610	51,290,403
• Present value of future employer contributions for:		
• Entry age cost	18,368,352	20,357,954
• Unfunded actuarial accrued liability	<u>312,731,441</u>	<u>307,191,195</u>
Total of current and future assets	<u>\$845,410,041</u>	<u>\$817,988,679</u>

Section 3: Supplemental Information

Exhibit A: Table of Plan Demographics

Category	Year Ended December 31		Change From Prior Year
	2021	2020	
Active participants in valuation:			
• Number	2,693	2,648	1.7%
• Average age	45.4	45.1	0.3
• Average years of service	7.8	7.8	0.0
• Total payroll	\$142,338,647	\$135,779,772	4.8%
• Average payroll	52,855	51,276	3.1%
• Account balances	54,590,311	52,073,173	4.8%
• Number with unknown age and/or service information	0	0	N/A
• Total active vested participants	1,444	1,396	3.4%
Inactive vested participants	376	314	19.7%
Retired participants:			
• Number in pay status	1,797	1,822	-1.4%
• Average age	73.0	72.5	0.5
• Average monthly benefit	\$2,011	\$1,974	1.9%
Disabled participants:			
• Number in pay status	111	117	-5.1%
• Average age	71.0	70.0	1.0
• Average monthly benefit	\$1,254	\$1,272	-1.4%
Beneficiaries:			
• Number in pay status	226	212	6.6%
• Average age	76.2	76.7	-0.5
• Average monthly benefit	\$1,140	\$1,079	5.7%

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of December 31, 2021 by Age, Years of Service, and Average Payroll

Age	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	73	70	3	--	--	--	--	--	--	--
	\$32,788	\$33,513	\$15,872	--	--	--	--	--	--	--
25 - 29	230	203	26	1	--	--	--	--	--	--
	43,677	43,819	43,144	\$28,882	--	--	--	--	--	--
30 - 34	330	206	104	18	2	--	--	--	--	--
	50,049	48,532	53,350	46,321	\$68,214	--	--	--	--	--
35 - 39	413	202	131	67	9	3	--	--	1	--
	54,571	51,383	58,340	59,464	45,472	\$33,096	--	--	\$23,384	--
40 - 44	333	142	104	50	18	16	3	--	--	--
	58,267	52,938	62,879	60,081	62,721	63,852	\$63,926	--	--	--
45 - 49	309	132	71	38	31	27	9	1	--	--
	55,903	52,201	58,214	55,994	61,300	61,071	55,655	\$72,420	--	--
50 - 54	296	103	61	48	28	29	20	7	--	--
	57,774	54,256	55,940	63,907	57,514	61,836	64,623	48,924	--	--
55 - 59	320	90	65	53	30	44	28	10	--	--
	54,409	55,544	51,227	49,468	48,067	59,226	62,645	65,850	--	--
60 - 64	218	76	60	25	18	18	12	4	--	5
	48,948	50,473	45,562	51,061	47,847	48,927	52,277	56,687	--	\$45,696
65 - 69	115	46	32	22	5	5	--	3	2	--
	52,069	48,231	47,547	65,315	61,548	44,692	--	43,990	73,835	--
70 & over	56	19	17	9	6	2	1	2	--	--
	53,527	59,802	42,952	71,657	42,215	45,851	35,325	52,938	--	--
Total	2,693	1,289	674	331	147	144	73	27	3	5
	\$52,855	\$49,499	\$54,540	\$57,481	\$54,759	\$58,089	\$60,299	\$56,962	\$57,018	\$45,696

Section 3: Supplemental Information

Exhibit C: Reconciliation of Participant Data

	Active Participants	Inactive Vested Participants	Disableds	Retired Participants	Beneficiaries	Total
Number as of January 1, 2021	2,648	314	117	1,822	212	5,113
• New participants	422	N/A	N/A	N/A	N/A	422
• Terminations – with vested rights	-74	74	0	0	0	0
• Terminations – without vested rights	-181	N/A	N/A	N/A	N/A	-181
• Retirements	-24	-17	N/A	41	N/A	0
• New disabilities	0	0	0	N/A	N/A	0
• Return to work	0	0	0	0	N/A	0
• Death	0	-1	-6	-75	-14	-96
• Lump sum cash-outs	-134	0	0	0	0	-134
• Rehire	38	-1	N/A	-2	N/A	35
• Certain period expired	N/A	N/A	0	0	0	0
• Data adjustments	-2	7	0	11	2	18
• Active participants no longer accruing benefits	0	0	N/A	N/A	N/A	0
• New Beneficiary	0	0	0	0	26	26
Number as of January 1, 2022	2,693	376	111	1,797	226	5,203

Section 3: Supplemental Information

Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended December 31, 2021	Year Ended December 31, 2020
Net assets at market value at the beginning of the year	\$460,642,035	\$418,971,331
Contribution income:		
• Employer contributions	\$21,651,850	\$32,615,183
• Member contributions	8,509,475	8,851,861
• Other contributions	965,183	261,920
• Less administrative expenses	<u>-560,127</u>	<u>-316,687</u>
<i>Net contribution income</i>	<i>\$30,566,381</i>	<i>\$41,412,277</i>
Investment income:		
• Investment income	\$72,408,859	\$54,893,727
• Less investment fees	<u>-1,457,787</u>	<u>-878,392</u>
<i>Net investment income</i>	<i><u>\$70,951,072</u></i>	<i><u>\$54,015,335</u></i>
Total income available for benefits	\$101,517,453	\$95,427,612
Less benefit payments:	-\$52,129,637	-\$53,756,908
Change in market value of assets	\$49,387,816	\$41,670,704
Net assets at market value at the end of the year	\$510,029,851	\$460,642,035

Section 3: Supplemental Information

Exhibit E: Summary Statement of Plan Assets

	December 31, 2021	December 31, 2020
Cash equivalents	\$24,969,026	\$39,548,422
Total accounts receivable	\$1,480,444	\$3,301,067
Investments:		
• Stocks and Equity	\$294,898,389	\$256,684,073
• Fixed Income	90,267,122	87,444,381
• Alternatives	100,239,648	77,286,509
Total investments at market value	\$485,405,159	\$421,414,963
Total assets	\$511,854,629	\$464,264,452
Total accounts payable	-1,824,778	-3,622,417
Net assets at market value	\$510,029,851	\$460,642,035
Net assets at actuarial value	\$461,092,638	\$439,149,127

Section 3: Supplemental Information

Exhibit F: Development of the Fund through December 31, 2021

Year Ended December 31	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return ¹	Admin. Expenses ²	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2012	\$19,010,841	\$5,155,380	\$1,685,729	\$35,842,303	\$0	\$40,696,429	\$338,607,461	\$372,049,545	109.9%
2013	18,544,682	5,953,535	1,483,869	50,131,156	0	42,265,089	372,455,614	365,102,483	98.0%
2014	20,306,887	6,193,573	1,677,851	15,155,075	0	45,038,930	370,750,070	352,915,906	95.2%
2015	22,447,281	6,490,092	1,622,658	-14,044,748	0	48,166,703	339,098,650	367,274,453	108.3%
2016	27,304,527	7,444,419	1,106,421	28,611,585	0	49,956,004	353,609,598	377,748,008	106.8%
2017	27,169,921	7,677,009	729,180	51,906,523	296,496	49,264,915	391,827,316	388,233,310	99.1%
2018	31,065,227	8,246,577	507,195	-15,589,616	243,972	50,075,418	365,737,309	403,015,342	110.2%
2019	33,884,678	9,134,139	264,650	59,043,437	376,002	48,716,880	418,971,331	425,079,078	101.5%
2020	32,615,183	8,851,861	261,920	54,015,335	316,687	53,756,908	460,642,035	439,149,127	95.3%
2021	21,651,850	8,509,475	965,183	70,951,072	560,127	52,129,637	510,029,851	461,092,638	90.4%

¹ On a market basis, net of investment fees and administrative expenses

² Information not available in prior actuary's reports

Section 3: Supplemental Information

Exhibit G: Table of Amortization Bases

Type	Date Established	Initial Period	Initial Amount	Annual Payment ¹	Years Remaining	Outstanding Balance
Initial UAL	01/01/2020	25	\$239,946,779	\$16,473,115	23	\$240,728,511
Actuarial Gain	01/01/2020	25	-12,750,278	-875,347	23	-12,791,818
Change in Assumptions	01/01/2020	25	70,869,862	4,865,443	23	71,100,752
Actuarial Loss	01/01/2021	25	6,288,682	421,208	24	6,303,884
Change in Assumptions	01/01/2021	25	-4,226,362	-283,076	24	-4,236,579
Plan Amendment	01/01/2021	25	2,955,892	197,982	24	2,963,038
Plan Amendment	01/01/2021	25	3,386,082	226,795	24	3,394,267
Actuarial Loss	01/01/2022	25	13,986,907	913,976	25	13,986,907
Change in Asset Method	01/01/2022	25	-8,717,521	-569,647	25	-8,717,521
Total				\$21,370,449		\$312,731,441

¹ Level percentage of payroll

Section 3: Supplemental Information

Exhibit H: Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Retirees and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing retirees and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or 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. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Section 3: Supplemental Information

Actuarial Present Value of Future Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is intended to pay off the Unfunded Actuarial Accrued Liability.

Section 3: Supplemental Information

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: <u>Investment return</u> - the rate of investment yield that the Plan will earn over the long-term future; <u>Mortality rates</u> - the rate or probability of death at a given age for employees and retirees; <u>Retirement rates</u> - the rate or probability of retirement at a given age or service; <u>Disability rates</u> - the rate or probability of disability retirement at a given age; <u>Withdrawal rates</u> - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; <u>Salary increase rates</u> - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Plan that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the AVA.

Section 3: Supplemental Information

GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	The portion of the Actuarial Present Value of Future Benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in each future year in determining the Amortization Period.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions	The information and analysis used in selecting each demographic assumption that has a significant effect on this actuarial valuation is from the 2011 – 2016 Actuarial Experience Study as performed by another actuary.																																																																				
Net Investment Return:	7.25%																																																																				
Salary Increases:	Age-based annual rates ranging from 10% to 3.2%																																																																				
Mortality Rates:	<p><i>Healthy Pre-Retirement:</i> PubG-2010 Employee Mortality Tables, amount-weighted, projected generationally with Scale MP-2020</p> <p><i>Healthy Post-Retirement:</i> PubG-2010 General Healthy Retiree Tables, amount-weighted, projected generationally with Scale MP-2020</p> <p><i>Disabled:</i> PubNS-2010 Non-Safety Disabled Retiree Tables, amount-weighted, projected generationally with Scale MP-2020</p>																																																																				
Termination Rates before Retirement:	<table border="1"> <thead> <tr> <th rowspan="3">Age</th> <th colspan="5">Rate (%)</th> </tr> <tr> <th colspan="2">Mortality¹</th> <th rowspan="2">Disability²</th> <th colspan="2">Withdrawal after 5 years of Service³</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>0.037</td> <td>0.013</td> <td>0.1650</td> <td>20.00</td> <td>18.00</td> </tr> <tr> <td>30</td> <td>0.036</td> <td>0.015</td> <td>0.1650</td> <td>15.00</td> <td>12.00</td> </tr> <tr> <td>40</td> <td>0.066</td> <td>0.036</td> <td>0.1350</td> <td>7.00</td> <td>6.00</td> </tr> <tr> <td>50</td> <td>0.149</td> <td>0.083</td> <td>0.5250</td> <td>7.00</td> <td>6.00</td> </tr> <tr> <td>60</td> <td>0.319</td> <td>0.186</td> <td>0.0000</td> <td>7.00</td> <td>6.00</td> </tr> <tr> <td>70</td> <td>0.703</td> <td>0.489</td> <td>0.0000</td> <td>7.00</td> <td>6.00</td> </tr> <tr> <td>80</td> <td>1.730</td> <td>1.330</td> <td>0.0000</td> <td>7.00</td> <td>6.00</td> </tr> <tr> <td>90</td> <td>1.730</td> <td>1.330</td> <td>0.0000</td> <td>7.00</td> <td>6.00</td> </tr> </tbody> </table> <p>¹ Mortality rates shown for base table. ² All disabilities are assumed to be Ordinary Disabilities. ³ For the first five years of service, turnover is as shown on the next page.</p>						Age	Rate (%)					Mortality ¹		Disability ²	Withdrawal after 5 years of Service ³		Male	Female	Male	Female	20	0.037	0.013	0.1650	20.00	18.00	30	0.036	0.015	0.1650	15.00	12.00	40	0.066	0.036	0.1350	7.00	6.00	50	0.149	0.083	0.5250	7.00	6.00	60	0.319	0.186	0.0000	7.00	6.00	70	0.703	0.489	0.0000	7.00	6.00	80	1.730	1.330	0.0000	7.00	6.00	90	1.730	1.330	0.0000	7.00	6.00
Age	Rate (%)																																																																				
	Mortality ¹		Disability ²	Withdrawal after 5 years of Service ³																																																																	
	Male	Female		Male	Female																																																																
20	0.037	0.013	0.1650	20.00	18.00																																																																
30	0.036	0.015	0.1650	15.00	12.00																																																																
40	0.066	0.036	0.1350	7.00	6.00																																																																
50	0.149	0.083	0.5250	7.00	6.00																																																																
60	0.319	0.186	0.0000	7.00	6.00																																																																
70	0.703	0.489	0.0000	7.00	6.00																																																																
80	1.730	1.330	0.0000	7.00	6.00																																																																
90	1.730	1.330	0.0000	7.00	6.00																																																																

Turnover during first five years of service		
Rate %		
Years of Service	Male	Female
0 but less than 1	35.0	35.0
1 but less than 2	30.0	25.0
2 but less than 3	20.0	20.0
3 but less than 4	20.0	20.0
4 but less than 5	15.0	15.0

Retirement Rates:	Age	Rate %
	Less than 60	30.0
	60	40.0
	61-65	30.0
	65-69	40.0
	70	100.0
Weighted Average Retirement Age:	Age 60, determined as follows: The weighted average retirement age for each participant is calculated as the sum of the product of each potential current or future retirement age times the probability of surviving from current age to that age and then retiring at that age, assuming no other decrements. The overall weighted retirement age is the average of the individual retirement ages based on all the active participants included in the January 1, 2020 actuarial valuation.	
Retirement Age for Inactive Vested Participants:	62	
Payroll Increase:	2.25%	
Administrative Expenses:	0.2% of payroll	
Unknown Data for Participants:	Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.	
Benefit Election:	All participants are assumed to elect the life only form of payment.	
Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the actuarial value, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.	

Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment, or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by service, with Normal Cost determined using the plan of benefits applicable to each participant.
Justification for Change in Actuarial Assumptions:	There have been no changes in actuarial assumptions since the last valuation.
Change in Asset Method:	With this valuation, the Board has elected to adopt a 5-year straight line amortization of investment gains and losses for the purpose of the actuarial value of assets. Previously, the System had used a seven-year smoothing period which reflected the actual cash flow and adjusted for each prior year's market value to the current valuation date using the actuarial interest assumption in effect for each of the seven years. The asset method was implemented as if it had been in effect for the past five years, recognizing prior years' market value asset gains and losses.

Exhibit II: Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	January 1 through December 31
Plan Status:	Ongoing
Normal Retirement:	
<u>Members Hired Prior to January 1, 2018</u>	
<i>Eligibility</i>	Age 65 and 5 years of service
<i>Amount</i>	2.5% of average compensation times creditable service for the first 25 years plus 4.0% of average compensation times creditable service thereafter
<i>Average Annual Compensation</i>	Average annual compensation for highest consecutive 60-month period. Compensation for purposes of calculating a pension is capped at \$200,000 per year.
<u>Members Hired on or After January 1, 2018</u>	
<i>Eligibility</i>	Age 65 and 5 years of service
<i>Amount</i>	2.5% of average compensation times creditable service
<i>Average Annual Compensation</i>	Average annual compensation for highest consecutive 60-month period. Compensation for purposes of calculating a pension is capped at \$150,000 per year, adjusted for inflation as determined by the Trustees from time to time.
Unreduced Early Retirement:	
<u>Members Hired Prior to January 1, 2018</u>	
<i>Eligibility</i>	Any age with 30 years of service or age plus service equals 80
<i>Amount</i>	Normal Retirement amount, unreduced
<u>Members Hired on or After January 1, 2018</u>	
<i>Eligibility</i>	Any age with 30 years of service, age 62 with 20 years of service, or age plus service equals 80
<i>Amount</i>	Normal Retirement amount, unreduced
Early Retirement:	
<i>Eligibility</i>	Age 60 and 10 years of service

<i>Amount</i>	Normal Retirement amount, reduced by 3% per year prior to age 62
Minimum Retirement Benefit:	\$3,600 per year for any member with at least 10 years of creditable service
Ordinary Disability:	
<i>Eligibility</i>	Any age with 10 years of service
<i>Amount</i>	75% of the benefit the member would have earned had they worked until age 65
Accidental Disability:	
<i>Eligibility</i>	Disability occurs as a result of an accident sustained while in the actual performance of duty, without willful negligence on the member's part
<i>Amount</i>	65% of the member's compensation for the 12 months preceding the accident, offset by any payments received from Workers Compensation
Vesting:	5 years of service
Spouse's Pre-Retirement Death Benefit:	
<u>Death while an Active Member</u>	
<i>Member had less than three years of service at date of death</i>	Refund of member contributions plus interest
<i>Member had at least three years of service at date of death</i>	Refund of member contributions plus interest plus 25% of the member's base pensionable earnings in the year preceding death plus 5% of the member's base pensionable earnings for each full year in excess of three years
<u>Death after Separation from Service</u>	
<i>Not Retirement Eligible</i>	Refund of member contributions plus interest
<i>Retirement Eligible</i>	Survivor's portion of 100% Joint and Survivor benefit with Pop-Up, payable as if member retired immediately prior to death
Post-Retirement Death Benefit:	Based on form of payment chosen by member upon retirement
Optional Forms of Benefits:	Life Only Annuity; 50% or 100% Joint and Survivor Pension with Pop-Up

DROP:	<p>Members eligible for Normal Retirement or Unreduced Early Retirement may elect to defer receipt of their retirement benefits while continuing employment*. Upon the effective date of participating in the DROP, a member's years of service and Average Monthly Compensation become frozen for purposes of determining pension benefits. Additional service beyond the date of DROP participation no longer accrues any additional benefits under the Retirement System. Benefits that would have been payable are accumulated at interest to date of termination and paid in a single lump sum or in substantially equal payments over a period designated by the member but not to exceed 119 months. The interest rate shall be determined annually by the Trustees and credited as of each December 31st.</p> <p>*Members with at least 10 years of creditable service as of January 1, 2018 have a maximum DROP period of five (5) years; all other members have a maximum DROP period of three (3) years.</p>
Contribution Rates: <i>Member</i> <i>Employer</i>	<p>6.0% of pensionable compensation</p> <p>Actuarial Determined Contribution less member contributions</p>
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

9534544v8/14922.006