USI CONSULTING GROUP

Knox County Employee Benefit System
Knox County Board of Education Retirement Plan

ACTUARIAL VALUATION REPORT

as of January 1, 2023

Issued: April 10, 2023

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VALUATION AS OF JANUARY 1, 2023

PRINCIPAL RESULTS OF THE VALUATION

Below is a summary of the principal results of this year's valuation compared with the previous valuation. Amounts for each valuation period reflect the actuarial cost method, assumptions and plan benefits in effect at that time.

	2022	2023
(A) Actuarially Determined Contribution		
(1) As of January 1	$ 430,080	$ 698,545
(2) As of July 1	$ 444,878	$ 721,736
(3) Contribution in Accordance with Funding Policy	$ 1,200,000	$ 1,200,000
(4) Recommended Contribution	N/A	$ 1,500,000
(B) Supporting Information		
(1) Market Value of Assets	$ 54,394,423	$ 42,141,915
(2) Actuarial Value of Assets	$ 50,474,677	$ 46,356,107
(3) Present Value of Accumulated Benefits	$ 60,333,291	$ 58,586,427
(4) Funding Ratio - Market Value (1) ÷ (3)	90.2%	71.9%
(5) Funding Ratio - Actuarial Value (2) ÷ (3)	83.7%	79.1%
(6) Funding Ratio Discount Rate	7.0%	6.75%
(7) Number of Lives Included in the Valuation	377	359
(8) EAN Accrued Liability	$ 60,333,291	$ 58,586,427
(9) Present Value of all Future Benefits	$ 60,333,291	$ 58,586,427

VALUATION AS OF JANUARY 1, 2023

EXECUTIVE SUMMARY

Purpose and Scope

The principal purposes of this actuarial valuation report are:

1. To present our calculations of the Actuarially Determined Contribution for the Plan Year beginning January 1, 2023,
2. To review Plan experience during the year ended December 31, 2022 and the funded status of the Plan as of January 1, 2023,
3. To provide an assessment and disclosure of risk with respect to pension obligations and contributions,
4. To determine the funded status of accumulated plan benefits in accordance with FASB ASC 960.

The valuation is based upon employee data and financial information provided by Knox County. This data was not audited or otherwise verified by us other than for tests of reasonable consistency with prior year data.

The actuarial liabilities shown in this report are determined using software purchased from an outside vendor which was developed for this purpose. Certain information is entered into this model in order to generate the liabilities specific to your pension plan. These inputs include economic and non-economic assumptions, plan provisions and census information. We rely on the coding within the software to value the liabilities using the actuarial methods and assumptions selected. Both the input to and the output from the model is checked for accuracy and reviewed for reasonableness.

Risk Assessment

This report includes information related to Actuarial Standards of Practice Number 51 (ASOP 51), Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Contributions.

Traditionally, the focus of valuation reports has centered around the current funded status of the Plan, experience during the prior year, and contribution requirements for the current year. This is now supplemented with additional information regarding risks that plan sponsors face as well as more historical information and measurements. The report does not provide: risk assessments related to potential legislative and regulatory changes, investment advice, or assessments of the ability or willingness of plan sponsors to make contributions to the Plan.

Actuarial Methods, Assumptions and Provisions

This valuation report is based on the cost method, assumptions, and plan provisions outlined on pages 18 through 23. There were several assumption changes adopted as a result of the Experience Study issued October 21, 2022. The funding discount rate was reduced from 7.0% to 6.75% and the mortality assumption was updated to the Pub-2010 Amount-Weighted General Below Median Mortality Table, with fully generational mortality improvement using Scale MP-2021. All other methods and assumptions remain the same as the 2022 Valuation Report.

The Actuarially Determined Contribution is calculated in accordance with the Knox County Board of Education Retirement Plan's funding policy.

In our opinion, all costs, liabilities, rates of interest and other factors under the Plan have been determined on the basis of actuarial assumptions and methods, which are each reasonable, taking into account the experience of the Plan in addition to future expectations and which, when combined, represent our best estimate of anticipated experience under the Plan.

VALUATION AS OF JANUARY 1, 2023

EXECUTIVE SUMMARY
(Continued)

Plan Experience

During 2022, the market value of Plan assets decreased from $54,394,423 to $42,141,915, with a net investment return of -13.47%. The investment performance is less than the 7.00% assumption, creating a market value loss. On a gross return basis, the loss is approximately $10,455,000 and this loss is used in the asset smoothing calculation.

The actuarial value of Plan assets decreased from $50,474,677 to $46,356,107 with a net investment return of approximately 2.43%. This resulted in an asset loss of about $2,191,000.

Recall that the asset smoothing method recognizes each year's investment gains and losses over a 5-year period. See page 8 for more details of the method. In this way, the actuarial value of assets methodology smooths out much of the volatility of annual changes in the market value of assets. Note that this year, the smoothed actuarial value of assets is greater than the market value of assets.

The Plan experienced a liability loss of approximately $91,000 due to mortality experience and actual cola adjustments being greater than expected.

In addition, the contribution policy to deposit $1,200,000 instead of an actuarially determined contribution created a contribution policy gain of $781,000.

The net experience loss for the year is $1,501,000 and is amortized over a 10-year period per the plan's funding policy.

The assumption changes as a result of the experience study issued in 2022 caused an increase to the liability of about $641,000. The loss is amortized over a 10-year period per the plan's funding policy.

Funding Status

The Plan's funding ratio, on an actuarial value of assets basis, as shown on Page 1, decreased from 83.7% in 2022 to 79.1% in 2023. The funding ratio on a market value basis decreased from 90.2% in 2022 to 71.9% in 2023.

The funding ratio may be appropriate for assessing the need for or the amount of future contributions, based on the assumptions stated in this report.

Future measurements may differ significantly from the information contained within this report. These measurements will be based on the market value of assets, which varies based on the underlying portfolio experience, as well as plan sponsor contributions, benefit payments and expenses paid from Plan assets. Liability calculations will be produced in accordance with current census data, as well as the interest rates and mortality tables in effect at that time. There has been no analysis of potential future impacts associated with this report.

EXECUTIVE SUMMARY
(Continued)

Contribution Requirements

The actuarially determined contribution is $721,736, calculated as payable on July 1, 2023. Please see page 11 for more details. In accordance with the funding policy adopted in 2020, the County will contribute the greater of the actuarially determined contribution and $1,200,000.

A recommended contribution of $1,500,000 is provided to mitigate the impact of increasing actuarially determined contributions in future years as prior gain amortization bases expire.

Funding Policy

Actuarially determined contributions to the Plan are determined each year as part of the Actuarial Valuation process. These contributions are determined according to the following funding policy:

Actuarial Cost Method:	Entry Age Normal
Asset Valuation Method:	The asset smoothing method utilized for this Plan shall be that investment gains or losses will be recognized over (5) years, providing that the actuarial value of assets shall not be greater than 110% of market value, nor less than 90% of market value.
Amortization Method:	The amortization policy shall be that the UAAL, as of January 1, 2014 and any changes thereafter as a result of a change in assumptions or methods or benefit or Plan changes, shall be amortized over a fixed period of 19 years beginning January 1, 2014. The amortization period for experience gains and losses shall be 10 years from the date of the actuarial valuation.
Contribution Funding Policy:	Effective 1/1/2020, the contribution funding policy requires plan to annually contribute at least the greater of $1,200,000 or the minimum Actuarially Determined Contribution ("ADC").

VALUATION AS OF JANUARY 1, 2023

EXECUTIVE SUMMARY
(Continued)

This report has been prepared in accordance with generally accepted actuarial standards and procedures and conforms to the Guidelines for Professional Conduct of the American Academy of Actuaries. It is based upon the employee and financial data submitted to USI Consulting Group by the Plan Sponsor and the retirement Plan provisions as outlined herein.

I, Jaime Packer, ASA, EA, am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

USI CONSULTING GROUP

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KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN

VALUATION AS OF JANUARY 1, 2023

FINANCIAL STATEMENT AS OF 1/1/2023

I. Statement of Assets and Liabilities	1/1/2022	1/1/2023
(A) Assets		
(1) Cash (and Money Market Funds)	$ 376,518	$ 1,147,460
(2) Receivables		
(a) Employer Contribution Receivable	$ 0	$ 0
(b) Participant Contribution Receivable	0	0
(c) Interest Receivable	0	0
(d) Investment Receivable	0	0
(e) Other	0	0
(g) Total Receivables	$ 0	$ 0
(3) Investments		
(a) Investment Securities	$ (567,324)	$ (302,277)
(b) Mutual Funds	54,585,229	41,296,732
(c) Corporate Bonds	0	0
(d) US Treasuries	0	0
(e) Other	0	0
(f) Total Investments	$ 54,017,905	$ 40,994,455
(4) Other Assets		
(a) Insurance Contracts	$ 0	$ 0
(b) Other	0	0
(c) Total Other Assets	$ 0	$ 0
(5) Total Assets	$ 54,394,423	$ 42,141,915
(B) Liabilities		
(1) Payables	$ 0	$ 0
(2) Other Liabilities	0	0
(3) Other Liabilities	0	0
(4) Total Liabilities	$ 0	$ 0
(C) Net Assets	$ 54,394,423	$ 42,141,915

VALUATION AS OF JANUARY 1, 2023

FINANCIAL STATEMENT AS OF 1/1/2023
(Continued)

II. Statement of Receipts and Disbursements

(A) Net Assets at Beginning of Year	$	54,394,423
(B) Receipts		
(1) Contributions Received or Receivable		
(a) Employers	$	1,200,000
(b) Employees		0
(c) Other		0
(d) Total Contributions	$	1,200,000
(2) Income		
(a) Dividends and Interest	$	1,640,608
(b) Net Realized Gain (Loss)		115,460
(c) Net Unrealized Gain (Loss)		(8,589,428)
(d) Other		0
(e) Total Income	$	(6,833,360)
(C) Disbursements		
(1) Distribution of Benefits		
(a) Directly to Participants or Beneficiaries	$	6,479,107
(b) Other to participants		0
(c) Other		0
(d) Total Distribution of Benefits	$	6,479,107
(2) Expenses		
(a) Administrative and Professional Fees	$	140,041
(b) Other Investment Expenses		0
(c) Other		0
(d) Other		0
(e) Total Expenses	$	140,041
(D) Net Income (loss)	$	(12,252,508)
(E) Net Assets at Year End	$	42,141,915
(F) Returns		
(1) Net Investment Return		-13.47%
(2) Gross Investment Return		-13.22%

VALUATION AS OF JANUARY 1, 2023

DETERMINATION OF VALUATION ASSETS AS OF 1/1/2023

(A) ASSET GAIN/(LOSS) AS OF 1/1/2023

(1) Expected market value of assets as of 1/1/2023		
(a) Market value of assets as of 1/1/2022	$	54,394,423
(b) Expected return on assets at 7.00%		3,807,610
(c) Contributions, excluding receivables		1,200,000
(d) Benefit Payments and Expenses		(6,619,148)
(e) Net interest on (c) + (d), weighted for timing		(186,462)
(f) Total	$	52,596,423
(2) Actual market value of assets 1/1/2023, excluding receivable	$	42,141,915
(3) Asset gain/(loss) as of 1/1/2023: (2) - (1)(f)	$	(10,454,508)

(B) DETERMINATION OF VALUATION ASSETS AS OF 1/1/2023

(1) Market value of assets as of 1/1/2023 $ 42,141,915

(2) Amortization of asset gain/(loss) over a 5-year period

	Year Ending December 31		Asset Gain/(Loss)	x	Portion Not Yet Recognized	=		Amortization
(a)	2022	$	(10,454,508)		4/5		$	(8,363,606)
(b)	2021		2,647,730		3/5			1,588,638
(c)	2020		1,151,386		2/5			460,554
(d)	2019		6,333,583		1/5			1,266,717
(e)	Total Amortization						$	(5,047,697)

(3) Receivable contributions as of 1/1/2023	$	0
(4) Valuation assets as of 1/1/2023: (1) - (2) + (3)	$	47,189,612

(C) Valuation assets as of 1/1/2023

(1) Valuation assets as of 1/1/2023		
(a) Valuation assets assets as of 1/1/2022	$	50,474,677
(b) Contributions, including receivables		1,200,000
(c) Benefit Payments		(6,479,107)
(d) Expenses		(140,041)
(e) Return on assets		1,300,578
(f) Total	$	46,356,107
(2) Market value corridor, including receivable		
(a) 90% of MVA	$	37,927,724
(b) 110% of MVA	$	46,356,107
(3) Valuation Assets, not less than (2a) or more than (2b)	$	46,356,107

VALUATION RESULTS AS OF 1/1/2023

(A) Present Value of Future Benefits

The value of all projected retirement, death, disability, and vested termination benefits expected to be paid to all current plan participants, discounted to the valuation date with interest, mortality, withdrawal, and disability decrements.

Active	$	0
Retired		58,586,427
Total	$	58,586,427

(B) Entry Age Accrued Liability

The portion of the present value of future benefit attributable to prior normal costs.

Active	$	0
Retired		58,586,427
Total	$	58,586,427

(C) Valuation Assets		47,189,612
(D) Unfunded Accrued Liability		12,230,320

(E) Entry Age Normal Cost

The amount required to fund the present value of benefits as a level percent of pay from entry age to retirement age.

(1) Total EAN Normal Cost	$	0
(2) Expected Employee Contributions		0
(3) Expected Expenses		0
(4) Total Employer Normal Cost	$	0

KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN

VALUATION AS OF JANUARY 1, 2023

DETERMINATION OF GAIN/(LOSS) AS OF 1/1/2023

(A) ASSET GAIN/(LOSS) AS OF 1/1/2023		
(1) Expected valuation assets as of 1/1/2023		
(a) Valuation assets as of 1/1/2022	$	50,474,677
(b) Expected return on assets at 7.00%		3,533,227
(c) Contributions, including receivable		1,200,000
(d) Benefit Payments		(6,479,107)
(e) Net interest on (c) + (d), weighted for timing		(181,643)
(f) Total	$	48,547,154
(2) Actual valuation assets as of 1/1/2023	$	46,356,107
(3) Asset gain/(loss) as of 1/1/2023: (2) - (1)(f)	$	(2,191,047)
(B) LIABILITY GAIN/(LOSS) AS OF 1/1/2023		
(1) Expected EAN Accrued Liability as of 1/1/2023		
(a) EAN accrued liability as of 1/1/2022	$	60,333,291
(b) Total normal cost		0
(c) Expected return at 7.00%		4,223,330
(d) Benefit Payments		(6,479,107)
(e) Net interest on (d), weighted for timing		(222,933)
(f) Total	$	57,854,581
(2) Actual EAN accrued liability as of 1/1/2023	$	58,586,427
(3) Liability gain/(loss) as of 1/1/2023: (1)(f) - (2)	$	(731,846)
(4) Liability gain/(loss) due to assumption change	$	(640,993)
(5) Liability gain/(loss) due to plan change	$	0
(6) Liability experience gain/(loss): (3) - (4)- (5)	$	(90,853)
(C) TOTAL GAIN/(LOSS) AS OF 1/1/2023		
(1) Expected UAL as of 1/1/2023		
(a) UAL as of 1/1/2022	$	9,858,614
(b) Total normal cost		0
(c) Expected return at 7.00%		690,103
(d) Contributions, including receivables		(1,200,000)
(e) Net interest on (d), weighted for timing		(41,290)
(f) Total	$	9,307,427
(2) Actual UAL as of 1/1/2023	$	12,230,320
(3) Total gain/(loss) as of 1/1/2023: (1)(f) - (2)	$	(2,922,893)
(4) Total Experience gain/(loss) as of 1/1/2023: C(3) - B(4) - B(5)	$	(2,281,900)
(5) Gain/(loss) due to contribution policy	$	781,104
(6) Net total gain/(loss): (4) + (5)	$	(1,500,796)

VALUATION AS OF JANUARY 1, 2023

CONTRIBUTION REQUIREMENTS FOR PLAN YEAR ENDING DECEMBER 31, 2023

The Plan has an Unfunded Accrued Liability using the Individual Entry Age Normal cost method. The Actuarially Determined Employer Contribution (ADC) will be the Plan's Normal Cost reduced by Expected Employee Contributions plus the sum of the amortization bases calculated below.

I. Actuarially Determined Employer Contribution

(A) Charges

(1) Employer Normal Cost		$ 0
(2) Outstanding Charge Base	$ 12,230,320	
(3) Amortization of Outstanding Charge Base		698,545
(4) Total Charges as of 1/1/2023: (1) + (3)		$ 698,545
(5) Total Interest on (4) to 7/1/2023		$ 23,191

(B) Summary of the Annual Contributions

(1) Total ADC as of 1/1/2023	$ 698,545
(2) Total ADC as of 7/1/2023	$ 721,736
(3) Expected Employee Contributions for the Plan Year	$ 0

II. Amortization Schedule

Description	Year Est.	Initial Amount	Outstanding Balance	Amortization Payment	Years Rem.
Past Service Base	2013	$ 18,652,856	$ 12,342,267	$ 1,627,175	10.0
(Gain)/Loss Base	2014	$ (4,106,438)	$ (546,415)	$ (546,415)	1.0
(Gain)/Loss Base	2015	$ (2,191,686)	$ (564,187)	$ (291,303)	2.0
(Gain)/Loss Base	2016	$ (743,453)	$ (277,785)	$ (98,705)	3.0
Balancing Base	2016	$ (19,079)	$ (7,128)	$ (2,533)	3.0
(Gain)/Loss Base	2017	$ (1,271,575)	$ (613,234)	$ (168,640)	4.0
Balancing Base	2017	$ (2,016)	$ (970)	$ (267)	4.0
Assumption Change	2018	$ 860,918	$ 663,896	$ 87,526	10.0
(Gain)/Loss Base	2018	$ (1,219,216)	$ (711,749)	$ (161,526)	5.0
Assumption Change	2019	$ 1,748,646	$ 1,404,357	$ 185,147	10.0
(Gain)/Loss Base	2019	$ 623,261	$ 422,975	$ 82,487	6.0
Assumption Change	2020	$ (104,634)	$ (87,930)	$ (11,592)	10.0
(Gain)/Loss Base	2020	$ 568,033	$ 435,860	$ 75,102	7.0
Assumption Change	2021	$ (71,190)	$ (62,951)	$ (8,299)	10.0
(Gain)/Loss Base	2021	$ (1,810,266)	$ (1,539,046)	$ (239,109)	8.0
Assumption Change	2022	$ 349,930	$ 327,759	$ 43,211	10.0
(Gain)/Loss Base	2022	$ (1,182,793)	$ (1,097,188)	$ (156,082)	9.0
(Gain)/Loss Base	2023	$ 1,500,796	$ 1,500,796	$ 197,861	10.0
Assumption Changes	2023	$ 640,993	$ 640,993	$ 84,507	10.0
Total			$ 12,230,320	$ 698,545	

Note: The 2013 Past Service Base was refreshed in 2014

VALUATION AS OF JANUARY 1, 2023

ACCUMULATED PLAN BENEFITS UNDER FASB ASC 960

I. Actuarial Present Value of Accumulated Plan Benefits (PVAB)

	1/1/2022	1/1/2023
(A) Actuarial Present Value of Vested Benefits		
(1) Participants Currently Receiving Benefits	$ 60,333,291	$ 58,586,427
(2) Participants Entitled to Deferred Benefits	0	0
(3) Other Participants	0	0
(4) Total Vested	$ 60,333,291	$ 58,586,427
(B) Actuarial Present Value of Non-Vested Benefits	$ 0	$ 0
(C) Total PVAB	$ 60,333,291	$ 58,586,427
(D) Market Value of Assets	$ 54,394,423	$ 42,141,915
(E) Actuarial Value of Assets	$ 50,474,677	$ 46,356,107

II. Statement of Changes in Actuarial Present Value of Accumulated Plan Benefits

(A) PVAB as of January 1, 2022	$ 60,333,291
(B) Increase (Decrease) Attributable to:	
(a) Decrease in Discount Period	$ 4,000,396
(b) Benefits Paid	(6,479,107)
(c) Assumption Changes	640,993
(d) Plan Amendments	0
(e) Benefits Earned, Incl. Experience Gains and Losses	90,854
(f) Total Change	$ (1,746,864)
(C) PVAB as of January 1, 2023	$ 58,586,427

III. Assumptions

	1/1/2022	1/1/2023
Discount Rate	7.00%	6.75%
Salary Increase	0.00%	0.00%
Cost of Living	2.50%	2.50%
Mortality	SOA RP-2014 Blue Collar table with 102% adjustment for Males and 97% for Females with Scale MP-2021	Pub-2010 Amount-Weighted General Below Median; fully generational, with Scale MP-2021

ASOP 51 ASSESSMENT AND DISCLOSURE OF RISK

Additional Information Regarding Assessment and Disclosure of Risks

The valuation of pension liabilities requires the use of certain assumptions to estimate events that are expected to occur in the future. These events can be economic, non-economic and demographic in nature. When actual experience in the future differs from the expected experience there is a direct effect on future pension liabilities. This in turn can impact both the funded position of the pension plan as well as the actuarially determined contribution amount.

Certain variables carry more risk than others. Included below is a brief explanation of those variables that can potentially have a significant effect on the plan's future financial condition.

Actuarially Determined Contribution Compared to Actual Contribution

The ADC is calculated using an actuarial funding method. The ADC can vary from year to year as actual experience differs from that expected. The funding method's intent is that if the ADC is deposited by the plan sponsor each year, then the plan would be sufficiently funded over the life of the plan so that promised benefits could be paid to all participants. A comparison of the ADC vs. contributions deposited by the plan sponsor for the most recent plan years are as follows:

Fiscal Year	ADC	Contribution
7/1/2021 - 6/30/2022	$ 444,878	$ 1,200,000
7/1/2020 - 6/30/2021	$ 562,566	$ 1,200,000
7/1/2019 - 6/30/2020	$ 820,399	$ 1,200,000

The Sponsor historically contributes at least 100% of the ADC. The contribution funding policy effective with 1/1/2020 valuation period requires plan to contribute at least the greater of $1,200,000 or the minimum ADC. As the $1,200,000 continues to be consistently greater than the ADC, the funded status will continue to improve, barring unexpected actuarial losses.

Risk Assessments

Investment Volatility Risk

There is an expectation that the assets of the pension plan will return an average long-term rate each year. If the actual annual net return on plan assets is consistently below the expected return, then both the funded ratio and ADC would be negatively impacted – the funded ratio would be lower than expected and the ADC would be higher. For example, an asset "loss" (where loss is the value relative to expected growth) of 10% (about $4,214,000 based on current values) in a given year would hypothetically cause the amortization portion of the ADC to increase on average by about $574,000 for each of the next 10 years. Also, the funded ratio would decrease by about 7.2 percentage points. An asset "gain" of 10% would result in a decrease in the amortization of $574,000 for 10 years and the funded ratio would increase by 7.2%. The impact is smoothed out due to the use of asset averaging.

ASOP 51 ASSESSMENT AND DISCLOSURE OF RISK
(Continued)

Investment Return Risk

The interest rate (which is equal to the Plan's expected return on assets rate) is used to discount the projected benefit payments from the Plan to calculate the present value of the liabilities (Accrued Liability). Decreases in the interest rate (as noted above) will lead to increases in the Accrued Liability, which may increase contribution requirements. As an example, a decrease of 25 basis points would lead to an increase in Accrued Liability of about 1.7%, yielding an increase in the ADC of about $114,000.

Longevity Risk

To the extent participants live longer than expected relative to the mortality assumptions, liabilities (and, thus, the ADC) will increase. For example, an increase in life expectancy of one year could cause an increase in the Accrued Liabilityof between 2% and 2.5%.

Demographic Risk

Several other assumptions are made with respect to anticipated plan experience, including rates of termination, disability, and the retirement age. To the extent actual experience differs from expected, plan liabilities and normal cost can vary up or down.

The Plan provides for annual increases to the monthly benefit, effective January 1 of the following year, equal to the percentage increase (or decrease) in the Consumer Price Index for the 12 months ending with the September 30th preceding the year of adjustment. The adjustment is made to the participant's original benefit (i.e. simple interest cola). The City Board votes on the adjustment and then informs the County. Over the past ten years, the actual increase has averaged about 2.0%. Annual COLA increases in excess of the assumed 2.50% will increase liabilities and the ADC, whereas annual COLA increases less than the assumed 2.50% will lower liabilities and the ADC.

For example, an increase of 25 basis points to the COLA assumption would lead to an increase in the Accrued Liability of about 1.0%, yielding an increase in ADC of about $83,000. A decrease in the COLA of 25 basis points would lead to a decrease in the Accrued Liability of about 1.0%, yielding a decrease in the ADC of about $83,000.

Expense Load

Certain expenses related to the administration of the plan are often paid out of plan assets (to the extent allowed by law). As a way to ensure plan assets are not depleted over time due to administrative costs, an expense load (usually a flat dollar amount or a small % of plan assets) may be added to the plan's normal cost, which is part of the contribution made by the plan sponsor each year. When actual administrative expenses for a given year are different from the assumed load amount, the plan will experience gains or losses that will be factored into the following year's contribution levels.

ASOP 51 ASSESSMENT AND DISCLOSURE OF RISK
(Continued)

Plan Maturity Measures

Certain statistics can help to gauge the financial strength of the pension plan as well as to help identify risk that the plan might be subject to as it matures over time. Certain plan maturity statistics for the current valuation year are included below for your review and analysis. Historical statistics incorporating some of the prior year results may be found in the Executive Summary section of this report.

Ratio of Retiree Liability to Total Plan Liability

Ratio = $58,586,000 / $58,586,000 = 100.0%

A pension plan with a high ratio (for example, more than 50%) is considered to be a relatively mature plan since the primary liability is associated with former employees who are now in pay status. As a result, a large amount of plan assets is disbursed to retired participants to satisfy the monthly payments due to this group. Plan sponsors should consult with the investment advisors to the pension plan to determine whether plan assets are invested accordingly to account for the benefit outflows.

Duration of the Actuarial Accrued Liability

The duration for your pension plan is approximately: 6.6, representing the average percentage change in the plan's actuarial accrued liability for a 100bp change in the interest rates used to measure plan liabilities. In general, pension plans with a younger participant group tend to have a larger duration than pension plans with an older population. Plans with a larger duration have liabilities that change more than pension plans with smaller duration when interest rates change. Also, changes in plan liabilities when interest rates drop will be larger than the changes in plan liabilities when interest rates rise by similar amounts. For example, a 100-basis point decrease in interest rates will increase your plan's actuarial accrued liability by 7.0% while a 100-basis point increase in interest rates will decrease your plan's actuarial accrued liability by 6.2%.

Ratio of Expected Outflows to Plan Assets

Ratio = $6,549,000 / $42,142,000 = 15.5%

Outflows are defined as: Benefit Payments + Expenses. This ratio measures the liquidity and time-horizon of the plan's assets. It can be used as one of the considerations of how much of the plan's assets should be allocated to short-term fixed income (or cash). Having sufficient amounts of cash on-hand within plan assets better allows for monthly benefit payments (and expenses, if applicable) to be made throughout the year without having to liquidate funds for cash flow at unexpected points in time.

ASOP 51 ASSESSMENT AND DISCLOSURE OF RISK
(Continued)

Ratio of Expected NET Outflows to Plan Assets

Ratio = ($5,349,000) / $42,142,000 = -12.7%

Net Outflows are defined as: Contributions – Outflows. This ratio represents the net cash flow of the Plan. A positive ratio means more cash is coming into plan assets than being paid out during the plan year, which is referred to as 'positive cash flow'. Thus, the opposite is true – a negative ratio means 'negative cash flow'. As a defined benefit plan matures, it (by its nature) becomes a negative net cash flow vehicle, so this ratio can be a measure of plan maturity.

Funded Status

Ratio = $42,142,000 / $58,586,000 = 71.9%

This statistic measures how well funded the pension plan is as of January 1, 2023 and is based on the ratio of the plan's market value of assets to the actuarial accrued liability. The funded status is impacted primarily by investment returns, interest rate changes, and pension plan funding policies. Additional factors, such as plan benefit or assumption changes, plan demographics and actual experiences, can also impact the funded status from year to year. Investment returns lower than expected may result in a ratio decrease. A drop in the interest rate would result in liability increases and the opposite occurs when interest rates increase. To the extent that more or less than the actuarially determined contribution is deposited to plan assets during the year, then the plan would be better or worse funded than expected.

Summary of Risk Assessments and Maturity Measures

While the risk due to some variables may easily be understood or predictable, there are many risks that are much more variable in nature, making it quite difficult to hedge against drastic changes in the plan's funded status. While past actuarial and demographic experience is not a perfect indicator of what the future will bring, it does provide a strong foundation for setting assumptions related to risk.

VALUATION AS OF JANUARY 1, 2023

PARTICIPANT DATA AS OF 1/1/2023

(A) Active Employees Under Retirement Age

(1) Number		0
(2) Total Annual Compensation	$	-
(3) Average Monthly Accrued Benefit	$	-
(4) Average Monthly Projected Benefit	$	-
(5) Average Attained Age		-
(6) Average Prior Credited Service		-

(B) Other Active and Inactive Employees

(1) Number		0
(2) Average Monthly Accrued Benefit	$	-
(3) Average Attained Age		-

(C) Deferred Vested

(1) Number		0
(2) Average Monthly Accrued Benefit	$	-
(3) Average Attained Age		-

(D) Retired and Contingent Annuitants

(1) Number		359
(2) Average Monthly Accrued Benefit	$	1,509.15
(3) Average Attained Age		78.2

(E) Reconciliation of Participant Status

	Active	Inactive	Deferred Vested	Disabled	In Pay Status	Total
As of 1/1/2022	0	0	0	0	377	377
Terminated - Vested						
Terminated - Not vested						
New Entrant					3	3
Death No Beneficiary					(18)	(18)
Death w/ Beneficiary					(3)	(3)
Disabled						
Beneficiary						
Retired						
Rehired						
Cashed Out						
Data Corrections						
As of 1/1/2023	0	0	0	0	359	359

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

ACTUARIAL COST METHOD

Individual Entry Age Normal Cost.

Under this method, the annual cost is equal to the normal cost, plus amortization of unfunded accrued liabilities over a fixed period of years selected within the minimum (10 years) and maximum (5 to 30 years) periods permitted by law.

The normal cost is the sum of individual normal costs, determined as a level percentage of compensation which would have been necessary to fund the employee’s projected retirement, death and withdrawal benefits, from entry age (the age at which the employee would have entered the Plan had it been in effect on his employment date), to his retirement age. Thus, the dollar normal cost is expected to increase with the salary projection assumption. The normal cost for this Plan is $0 as there are no active employees.

The actuarial accrued liability is the accumulation, based on the actuarial assumptions, of all assumed prior normal costs. Thus, it represents the amount of reserves, which would be held by the Plan, had it always been in effect for the present group of participants and had Plan experience followed that predicted by the actuarial assumptions. The unfunded accrued liability is the excess, if any, of the accrued liability over the Plan assets.

Actuarial gains and losses arising from differences between Plan experience and that predicted by the actuarial assumptions, as measured by the difference between actual and expected unfunded accrued liabilities, are amortized over 10 years.

ATTRIBUTION PARAMETERS

The Plan has no active participants.

ACCRUED AND VESTED BENEFITS

Vested benefits are based on the Plan Document’s vesting schedule based on years of service. Please refer to the Summary of Plan Provisions section of this report for requirements for particular benefits.

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS
(Continued)

ACTUARIAL ASSUMPTIONS

Pre-Retirement Mortality:	There are no pre-retirement assumptions as all participants are retired.
Post-Retirement Mortality:	Prior Year: Base Table: RP-2014 Blue Collar table with 102% adjustment for Males and 97% adjustment for Females Improvement Scale: Scale MP-2021 Projection Period: 6 years beyond each valuation date Current Year: Base Table: Pub-2010 Amount-Weighted General Below Median Mortality Table for retirees and contingent annuitants Improvement Scale: Scale MP-2021 Projection Period: Fully Generational Retiree's mortality is used for contingent annuitants until the participant's death
Investment Return:	Prior Year: 7.00% per annum Current Year: 6.75% per annum
Assumed Benefit Increases:	Prior Year: 2.5% per annum on the participant's original benefit Current Year: 2.5% per annum on the participant's original benefit
Expense Loading:	None
Long-Term Inflation:	This assumption is an underlying component of a number of these economic assumptions. This assumption reflects consumer price indices, forecasts of inflation, yields on government securities of various maturities, and yields on nominal and inflation-indexed debt.

RATIONALE FOR ASSUMPTIONS

The actuarial assumptions used in the January 1, 2023 valuation were based on the results of an actuarial experience study prepared in 2022 based on data from January 1, 2012 through December 31, 2021. The assumption changes from 2022 to 2023 include a reduction in the discount rate from 7.0% to 6.75% and adoption of the Pub-2010 Amount-Weighted Below Median Mortality Table with fully generational mortality improvement.

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS
(Continued)

ASSET VALUATION

Each plan year's investment gain or loss is recognized over five years, subject to a 10% corridor around the market value of assets.

Investment Return – 6.75% per annum. The return reflects the anticipated gross long-term rate of return on Plan assets based on the Plan's current and expected future asset portfolio, as supported by the Plan's investment manager. The following was the Board's adopted asset allocation policy as of January 1, 2023:

Fund Name	Target Allocation
Large Cap	21%
Small/Mid Cap	14%
Non-US Equity - Developed	16%
Non-US Equity - Emerging	4%
US Corporate Bonds - Core	12%
US Corporate Bonds - High Yield	5%
Non-US Debt - Developed	4%
US Treasuries (Cash Equivalent)	6%
Real Estate	4%
Hedge Funds	14%

VALUATION AS OF JANUARY 1, 2023

SUMMARY OF PLAN PROVISIONS

Effective Date: Shall mean for credited service July 1, 1987 and for all other purposes June 26, 1990.

Eligibility: Participation: Any person who is a "teacher" as defined by the Court of Appeals in its opinion of December 30, 1987 in the case of Knox County v. The City of Knoxville, et al, and who is entitled to maintain membership in a local pension system as a result of their membership in any applicable plan of the City of Knoxville Pension System on June 30, 1987, and who thereafter is employed as a result of the City of Knoxville ceasing to operate a separate school system and is so regularly employed by the Knox County Board of Education.

Normal Retirement:

Eligibility: Each member shall be eligible to retire at age 62 or on the first day of any of the thirty-five months next following age 62.

Benefit: A monthly benefit payable for life, computed as of normal retirement date as one-twelfth of credited service multiplied by the sum of (A) and (B):

(A) Benefit Rate A times average base earnings

(B) Benefit Rate B times average excess earnings

Benefit Rate A and Benefit Rate B shall vary according to the member's last birthday at time benefit payments are to commence, as follows:

Age	Benefit Rate A	Benefit Rate B
62 or earlier	0.75%	1.50%
63	0.78%	1.58%
64	0.84%	1.66%
65 or later	0.88%	1.76%

This amount is then reduced by the benefit accrued under the applicable City of Knoxville Retirement Plan as of June 30, 1987.

Minimum Benefit: The monthly benefit, including 50% of the primary Social Security benefit, shall not be less than $10 per year of credited service, with a maximum of $250.

Earnings: Total compensation

VALUATION AS OF JANUARY 1, 2023

SUMMARY OF PLAN PROVISIONS
(Continued)

Base Earnings:	That part of earnings in any calendar year which does not exceed $4,800.00 per annum.
Excess Earnings:	That part of earnings in any calendar year which are in excess of base earnings.
Credited Service:	Years and completed calendar months of service as an employee of either the City of Knoxville or Knox County.
Average Earnings:	A 3-year arithmetic average determined for the number of full calendar years of credited service during which the earnings were the highest, or number of full calendar years actually completed if less than 3.

<u>Accrued Benefit:</u> Normal retirement benefit based on service and compensation up to the determination date less that benefit accrued under the applicable City of Knoxville Retirement Plan as of June 30, 1987.

<u>Early Retirement:</u>

Eligibility:	Completion of 25 years of credited service.
Benefit:	Upon early retirement, a member may elect to receive either (a) a deferred monthly benefit equals to his accrued benefit commencing at normal retirement date, or (b) a reduced benefit equals to the actuarially equivalent benefit described in (a) above, commencing immediately.

<u>Disability in Line of Duty:</u>

Eligibility:	Disablement in the course of performance of duty as an employee.
Benefit:	Accrued benefit, based on credited service projected to age 62, payable immediately and reduced by any workers' compensation benefits paid.

SUMMARY OF PLAN PROVISIONS
(Continued)

Death Benefit:

Eligibility: Completion of 15 years of credited service.

Benefit: 50% of the monthly benefit that the participant would have been entitled to if he/she had elected the 50% joint and survivor form of payment, payable at the earliest time benefits could have commenced to the participant.

Deferred Vested:

Eligibility: Completion of 10 years of credited service.

Benefit: A deferred monthly benefit equal to the accrued benefit commencing at normal retirement date, determined as of the date of termination, provided the member leaves his contributions in the fund.

Return of Employee Contribution: A minimum of employee contributions with interest is paid on death, termination, or retirement.

Normal Form of Annuity: Life Annuity

Optional Forms of Annuity: Certain and Life, Joint and Survivor, Cash Refund. Such options will be actuarially equivalent to a life annuity.

Employee Contributions: Each employee who is a member shall contribute to the fund an amount equal to (a) plus (b) where:

(a) The contribution rate shall be 3 percent of base earnings, and

(b) The contribution rate shall be 5 percent of excess earnings.

Cost of Living Increase: Currently the Plan provides for increases to the monthly benefit amounts paid to retirees. The Plan provides for annual increases to the monthly benefit, effective January 1 of the following year, equal to the percentage increase (or decrease) in the Consumer Price Index for the 12 months ending with the September 30th preceding the year of adjustment. The adjustment is made to the participant's original benefit (i.e. simple interest cola). The City Board votes on the adjustment and then informs the County.