



CONSULTING GROUP



# A DEFINED BENEFIT ACTUARIAL VALUATION

*For:*

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

*As of:*

January 1, 2018

*Prepared by:*  
USI Consulting Group



CONSULTING GROUP

April 6, 2018

CONFIDENTIAL

Ms. Kim Bennett  
Executive Director  
Knox County Retirement and Pension Board  
City-County Bldg, Room 371  
400 Main Street  
Knoxville, TN 37902-2409

**Re: Knox County Board of Education Retirement Plan**

Dear Kim:

We are pleased to present our Actuarial Valuation Report for the Plan Year beginning January 1, 2018. A summary of the principal results of the report is provided for your convenience on pages one through three. Details supporting the cost calculations will be included in the GASB report that will be issued later this year.

The Actuarially Determined Contribution for the fiscal year is \$475,234 calculated as payable on July 1, 2018. This contribution has decreased from last year's valuation. Page 3 of this report displays estimated future Actuarially Determined Contributions for this plan.

We would be happy to answer any questions you may have regarding this report.

Sincerely,

USI CONSULTING GROUP

A handwritten signature in blue ink, appearing to read "Bob Cross", written over a horizontal line.

Bob Cross, ASA, MAAA, FCA  
President, Southeast and Midwest

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

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

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**VALUATION AS OF 1/1/2018**

**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.

	<u>As of</u> <u>January 1, 2017</u>	<u>As of</u> <u>January 1, 2018</u>
<b><u>CONTRIBUTION LIMITATIONS</u></b>		
Actuarially Determined Contribution	\$ 551,669	\$ 475,234
Expected Employee Contribution	\$ 0	\$ 0
<b><u>SUPPORTING INFORMATION</u></b>		
Market Value of Assets	\$ 57,734,604	\$ 59,949,534
Actuarial Value of Assets	\$ 59,378,498	\$ 57,828,525
Entry Age Normal Accrued Liability	\$ 68,983,539	\$ 67,176,971
Present Value of Accumulated Benefits	\$ 68,983,539	\$ 67,176,971
Funding Ratio – Actuarial Value of Assets as a Percentage of Present Value of Accumulated Benefits	86.1%	86.1%
Funding Ratio – Market Value of Assets as a Percentage of Present Value of Accumulated Benefits	83.7%	89.2%
Funding Ratio Discount Rate	7.0%	7.0%
Number of Lives Included in the Valuation	433	425
Present Value of All Future Benefits	\$ 68,983,539	\$ 67,176,971

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**VALUATION AS OF 1/1/2018**

**EXECUTIVE SUMMARY**

Purpose and Scope

The principal purposes of this actuarial valuation report are:

1. To present our calculation of the Plan contributions under the Knox County Employee Benefit System Knox County Board of Education funding policy,
2. To review plan experience during the year ended December 31, 2017 and the funded status of the plan as of January 1, 2018.

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.

Actuarial Methods and Assumptions

This valuation report is based on the cost method, assumptions, and plan provisions outlined on pages 12 through 17. The actuarially determined contribution is calculated in accordance with the Knox County Board of Education Retirement Plan funding policy. Based on the experience study that was completed in 2017, the mortality table was updated to the TCRS tables. All other methods and assumptions remain the same as the 2017 Valuation Report.

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.

Plan Experience

During 2017, the market value of plan assets increased from \$57,734,604 to \$59,949,534 with a net investment return of approximately 15.11%. This investment performance is above the 7.0% assumption, creating a market value gain of about \$4,431,000. On a gross return basis, there is a gain of approximately \$4,720,000 and this gain is used in the asset smoothing calculation. The actuarial value of plan assets decreased from \$59,378,498 to \$57,828,525 with a net investment return of approximately 7.98%. This resulted in an asset gain of about \$551,000. The plan also experienced a liability gain of approximately \$668,000, mostly a result of the actual cost of living adjustment for the past year (2.2% increase) being less than the 3% assumption. The change in the mortality assumption caused a loss of about \$861,000. The net actuarial gain to the plan was about \$358,000.

Recall that the asset smoothing method recognizes each year's investment gains and losses over a five year period. See page 7 for more details of the method. In this way, the actuarial value of assets methodology smoothes out much of the volatility of annual changes in the market value of assets. Note that this year, the actuarial value of assets is less than the market value of assets.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**VALUATION AS OF 1/1/2018**

**EXECUTIVE SUMMARY  
(Continued)**

Contribution Requirements

The actuarially determined contribution for the 2018 fiscal year is \$475,234, calculated as payable on July 1, 2018. Please see page 10 for more details.

The actuarially determined contribution has decreased from \$551,669 last year to \$475,234 this year. This decline is a result of the large experience gain created by positive asset performance and the cost of living adjustment being less than anticipated. However, in future years the actuarially determined contribution is expected to increase. The chart below shows the estimated contributions for plan over the next 20 years. Please note that these numbers may change based on actual asset returns and mortality experience.

	<b>Contribution Pattern Based on Funding Policy</b>			
	Actuarially Determined Contribution	Market Value of Assets	Plan Liability	Funded Ratio
1/1/2018	475,000	59,950,000	67,177,000	89%
1/1/2019	459,000	57,709,000	65,049,000	89%
1/1/2020	434,000	55,313,000	62,786,000	88%
1/1/2021	293,000	52,739,000	60,374,000	87%
1/1/2022	165,000	49,876,000	57,826,000	86%
1/1/2023	176,000	46,743,000	55,154,000	85%
1/1/2024	751,000	43,486,000	52,374,000	83%
1/1/2025	1,061,000	40,704,000	49,501,000	82%
1/1/2026	1,174,000	38,180,000	46,553,000	82%
1/1/2027	1,357,000	35,754,000	43,551,000	82%
1/1/2028	1,531,000	33,529,000	40,517,000	83%
1/1/2029	1,554,000	31,534,000	37,472,000	84%
1/1/2030	1,584,000	29,652,000	34,438,000	86%
1/1/2031	1,730,000	27,919,000	31,439,000	89%
1/1/2032	1,862,000	26,485,000	28,496,000	93%
1/1/2033	66,000	25,375,000	25,632,000	99%
1/1/2034	61,000	22,632,000	22,869,000	99%
1/1/2035	55,000	20,013,000	20,229,000	99%
1/1/2036	50,000	17,537,000	17,733,000	99%
1/1/2037	<u>46,000</u>	15,223,000	15,398,000	99%
	14,884,000			

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

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**VALUATION AS OF 1/1/2018**

**EXECUTIVE SUMMARY  
(Continued)**

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 the BOE 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.

Funding Status

The plan's funding ratio, on an actuarial value of assets basis, as shown on page 1 remained level at 86.1% for the 2018 plan year. Note that the funding ratio on a market value basis increased from 83.7% in 2017 to 89.2% in 2018.

The funded ratio is 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.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**VALUATION AS OF 1/1/2018**

**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.

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

USI CONSULTING GROUP



Jaime Packer, ASA, EA, MAAA  
Associate Vice President & Actuary



Diane Padernacht  
Associate Vice President and Actuarial Manager



Dan Grosso  
Actuarial Consultant and Team Leader



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

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**FINANCIAL STATEMENT AS OF 1/1/2018**

<b>ASSETS</b>	<u>1/1/2017</u>	<u>1/1/2018</u>
Cash and Cash Equivalent	(2,634,203)	(1,753,182)
Participants' Contributions Receivable	0	0
Interest Receivable	38,234	1,140
Receivable for Investments Sold	0	289,499
Investment Securities	2,342,516	3,778,685
Mutual Funds	50,096,689	3,067,790
Common Collective Trust	0	54,565,602
Corporate Bonds	1,005,011	0
US Treasuries	4,082,611	0
Federal Agency Debt Securities	221,057	0
Federal Agency Mortgage	<u>2,648,578</u>	<u>0</u>
Total Assets	57,800,491	59,949,534
 <b>LIABILITIES AND NET ASSETS</b>		
Payables	65,887	0
Acquisition Indebtedness	0	0
Other Liabilities	<u>0</u>	<u>0</u>
Total Liabilities	65,887	0
 <b>NET ASSETS</b>	 57,734,604	 59,949,534
 <b>STATEMENT OF RECEIPTS AND DISBURSEMENTS</b>		
Net Assets at Beginning of Year		57,734,604
Contributions Received or Receivable		
Employer	551,669	
Employees	0	
Others	0	
Total Contributions		551,669
Dividends and Income		287,956
Other Income		0
Net Realized Gain (Loss)		4,372,307
Net Unrealized Gain (Loss)		<u>3,883,751</u>
Total Income		9,095,683
Distribution of Benefits		
Directly to Participants or Beneficiaries	6,601,229	
Other	0	6,601,229
Fees and Commissions		132,818
Other Expenses		<u>146,706</u>
Total Expenses		6,880,753
Net Income (loss)		2,214,930
<b>NET ASSETS AT END OF YEAR</b>		<b>59,949,534</b>
 Net Investment Return		 15.11%
Gross Investment Return		15.66%

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**DETERMINATION OF VALUATION ASSETS AS OF 1/1/2018**

**1. ASSET GAIN/(LOSS) AS OF 1/1/2018**

(1) Expected market value of assets as of 1/1/2018:	\$	
(a) Market value of assets as of 1/1/2017	\$	57,734,604
(b) Expected return on assets at 7.0%	\$	4,041,422
(c) Contributions	\$	551,669
(d) Benefit Payments and Expenses	\$	(6,880,753)
(e) Net interest on (c) - (d), weighted for timing	\$	<u>(217,771)</u>
(f) Total: (a) + (b) + (c) + (d) + (e)	\$	55,229,171
(2) Actual Market value of assets as of 1/1/2018:	\$	59,949,534
(3) Asset gain/(loss) as of 1/1/2018: (2) - (1)(f)	\$	4,720,363

**2. DETERMINATION OF VALUATION ASSETS AS OF 1/1/2018**

(1) Market value of assets as of 1/1/2018:	\$	59,949,534	
(2) Recognition of asset gain/(loss) over a five year period:			
Year Ending	Asset	Portion Not	Amount
<u>December 31</u>	<u>Gain/(Loss)</u>	X <u>Yet Recognized</u>	= <u>Deferred</u>
2017	\$ 4,720,363	4/5	\$ 3,776,290
2016	\$ 178,810	3/5	\$ 107,286
2015	\$ (4,253,553)	2/5	\$ (1,701,421)
2014	\$ (305,728)	1/5	\$ (61,146)
Total:			\$ 2,121,009
(3) Accrued contributions as of 1/1/2018:	\$	0	
(4) Valuation assets as of 1/1/2018: (1) - (2) + (3)	\$	57,828,525	

**3. VALUATION ASSETS AS OF 1/1/2018**

(1) Valuation assets as of 1/1/2017: (1) + (2) + (3) + (4) + (5)	\$	59,378,498
(2) Contributions, including receivables:	\$	551,669
(3) Benefit payments:	\$	(6,601,229)
(4) Plan expenses:	\$	(279,524)
(5) Return on assets:	\$	<u>4,779,111</u>
(6) Valuation assets as of 1/1/2018: (1) + (2) + (3) + (4) + (5)	\$	57,828,525
(7) 90% of Market Value	\$	53,954,581
(8) Final Actuarial Value of Assets, no less than (7)	\$	57,828,525

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**VALUATION RESULTS AS OF 1/1/2018**

1. 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.

	<u>Lives</u>	<u>Retirement</u>	<u>Death</u>	<u>Withdrawal</u>	<u>Disability</u>	<u>Total</u>
Active	0	0	0	0	0	0
Terminated	0	0	0	0	0	0
Retired	<u>425</u>	<u>67,176,971</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>67,176,971</u>
Totals	425	67,176,971	0	0	0	67,176,971

2. ENTRY AGE ACCRUED LIABILITY

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

Active	0
Terminated	0
Retired	<u>67,176,971</u>
Total	67,176,971

3. ACTUARIAL VALUE OF ASSETS

57,828,525

4. UNFUNDED ACCRUED LIABILITY (2 - 3)

9,348,446

5. 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.

A. Total Normal Cost	0
B. Expected Employee Contributions	<u>0</u>
C. Employer Normal Cost	0

The Normal Cost is zero because there are no active participants in the plan.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM**  
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**DETERMINATION OF GAIN/LOSS AS OF 1/1/2018**

**1. ASSET GAIN/(LOSS) AS OF 1/1/2018**

(1) Expected valuation assets as of 1/1/2018:	
(a) Valuation assets as of 1/1/2017	\$ 59,378,498
(b) Expected return on assets at 7.0%	\$ 4,156,495
(c) Contributions	\$ 551,669
(d) Benefit Payments	\$ (6,601,229)
(e) Net interest on (c) - (d), weighted for timing	\$ (208,154)
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 57,277,279
(2) Actual valuation assets as of 1/1/2018:	\$ 57,828,525
(3) Asset gain/(loss) as of 1/1/2018: (2) - (1)(f)	\$ 551,246

**2. LIABILITY GAIN/(LOSS) AS OF 1/1/2018**

(1) Expected EAN accrued liability as of 1/1/2018:	
(a) EAN accrued liability as of 1/1/2017	\$ 68,983,539
(b) Total normal cost	\$ 0
(c) Expected increase in liability at 7.0%	\$ 4,828,848
(d) Benefit Payments	\$ (6,601,229)
(e) Net interest on (c) - (d), weighted for timing	\$ (227,135)
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 66,984,023
(2) Actual EAN accrued liability as of 1/1/2018:	\$ 67,176,971
(3) Liability gain/(loss) as of 1/1/2018: (1)(f) - (2)	\$ (192,948)
(4) Liability gain/(loss) due to assumption change:	\$ (860,918)
(5) Liability gain/(loss) as of 1/1/2018: (3) - (4)	\$ 667,970

**3. TOTAL GAIN/(LOSS) AS OF 1/1/2018**

(1) Expected Unfunded Accrued Liability (UAL) as of 1/1/2018:	
(a) UAL as of 1/1/2017	\$ 9,605,041
(b) Total normal cost	\$ 0
(c) Expected increase in UAL at 7.0%	\$ 672,353
(d) Contributions	\$ (551,669)
(e) Net interest on (c) - (d), weighted for timing	\$ (18,981)
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 9,706,744
(2) Actual UAL accrued liability as of 1/1/2018:	\$ 9,348,446
(3) Total gain/(loss) as of 1/1/2018: (1)(f) - (2)	\$ 358,298
(4) Gain/(loss) due to assumption change:	\$ (860,918)
(5) Total experience gain/(loss) as of 1/1/2018: (3) - (4)	\$ 1,219,216

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

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**CONTRIBUTION REQUIREMENTS FOR PLAN YEAR ENDING DECEMBER 31, 2018**

The Plan has an Unfunded Accrued Liability using the Individual Entry Age Normal cost method. The Actuarially Determined Contribution will be the Plan's Normal Cost reduced by Expected Employee Contributions (see pg. 8) plus a 15 year amortization of the Past Service Base in effect on January 1, 2018 (see below) plus amortizations of prior years' experience gain or loss (see pg. 9).

**ACTUARIALLY DETERMINED EMPLOYER CONTRIBUTION**

**CHARGES:**

(1) Employer Normal Cost		0
(2) Outstanding Charge Base	9,348,446	
(3) Amortization of Outstanding Charge Base		<u>459,426</u>
(4) Total Charges = (1) + (3)		459,426
(5) Interest Charge on (1) and (3)		15,808

**Annual Contributions**

	<u>2017</u>	<u>2018</u>
Total Actuarially Determined Employer Contribution as of Beginning of the Plan Year	533,319	459,426
Total Actuarially Determined Employer Contribution as of Beginning of fiscal year starting July 1	551,669	475,234
Expected Employee Contributions for the Plan Year	0	0

**AMORTIZATION SCHEDULE**

Description

	Year Est.	Initial Amount	Outstanding Balance	Amortization Payment	Years Remaining
Past Service Base	2013	18,652,856	16,004,982	1,642,300	15.0
(Gain)/Loss Base	2014	(4,106,438)	(2,786,824)	(546,415)	6.0
(Gain)/Loss Base	2015	(2,191,686)	(1,681,713)	(291,633)	7.0
(Gain)/Loss Base	2016	(743,453)	(632,067)	(98,926)	8.0
Balancing Base	2016	(19,079)	(16,222)	(2,539)	8.0
(Gain)/Loss Base	2017	(1,271,575)	(1,179,544)	(169,200)	9.0
Balancing Base*	2017	(2,016)	(1,868)	(268)	9.0
Assumption Change	2018	860,918	860,918	88,340	15.0
(Gain)/Loss Base	2018	(1,219,216)	<u>(1,219,216)</u>	<u>(162,233)</u>	10.0
			9,348,446	459,426	

\* The excess contributions (plus interest) of \$2,016 creates a 'gain' that lowers the amortization base and therefore decreases the Actuarially Determined Contribution for the current plan year.

Note: The 2013 Past Service Base was refreshed in 2014.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**PARTICIPANT DATA AS OF 1/1/2018**

Active employees under assumed retirement age	
Number .....	0
Expected total annual compensation .....	N/A
Average accrued benefit .....	N/A
Average projected benefit .....	N/A
Average attained age .....	N/A
Average prior service .....	N/A
Other active and inactive employees	
Number .....	0
Average accrued benefit .....	N/A
Average attained age .....	N/A
Terminated deferred vested, deceased and disabled employees	
Number .....	0
Average accrued benefit .....	N/A
Average attained age .....	N/A
Retired employees, beneficiaries and contingent annuitants	
Number .....	425
Average monthly benefit .....	1,302.61
Average attained age .....	74.06

**RECONCILIATION OF PARTICIPANT STATUS**

	<u>Active</u>	<u>Inactive</u>	<u>Deferred Vested</u>	<u>Pay Status</u>	<u>Total</u>
Prior Valuation	0	0	0	433	433
Terminated - vested	0	0	0	0	0
Cashed Out	0	0	0	0	0
Death	0	0	0	(13)	(13)
Entered as Beneficiary	0	0	0	5	5
Retired	0	0	0	0	0
Rehired	0	0	0	0	0
Beneficiary Payments Cease	0	0	0	0	0
Data Corrections	0	0	0	0	0
Current Valuation	0	0	0	425	425

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

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**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.

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

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**SUMMARY OF PLAN PROVISIONS**  
**(Continued)**

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
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.
<b>Accrued Benefit</b>	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.
<b>Early Retirement</b>	
Eligibility	Completion of 25 years of credited service.
Benefit	Upon early retirement, a member may elect to receive either (a) a deferred monthly benefit equal to his accrued benefit commencing at normal retirement date, or (b) a reduced benefit equal to the actuarially equivalent benefit described in (a) above, commencing immediately.
<b>Disability Not In Line of Duty</b>	
Eligibility	Completion of 15 years of credited service.
Benefit	Accrued benefit, based on credited service at time of disablement, payable immediately, plus a lump sum equal to six times the accrued monthly benefit.



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

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**SUMMARY OF PLAN PROVISIONS  
(Continued)**

**Disability in Line of Duty**

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.

**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 amount of the increase is tied to cost of living with an annual maximum of 3%.

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

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**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 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.

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

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**SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS  
(Continued)**

ACTUARIAL ASSUMPTIONS

Post-Retirement

Mortality

Prior Year— 1983 Group Annuity Mortality Table for Males and Females, no mortality improvement scale is applied.

Current Year – Linked to the current mortality assumption utilized by the Tennessee Consolidated Retirement System (TCRS)

Base Table: 2008-2012 TCRS Experience

Improvement Scale: Scale AA

Projection Period: 2 years

Investment Return – 7.0% per annum.

Assumed benefit increases – 3.00% per annum on the participant’s original benefit, based on plan provisions

Pre-Retirement

Mortality – N/A – All participants are retired.

Salary projection – N/A

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.

Retirement age – N/A

Disability rates – N/A

Withdrawal rates – N/A

The actuarial assumptions used in the January 1, 2018 valuation were based on the results of an actuarial experience study prepared in 2017 based on data from January 1, 2007 through December 31, 2016.

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

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**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 – 7.0% 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, 2018:

<u>Fund Name</u>	<u>Client Allocation</u>
MFS® Value R6	8.00%
Vanguard 500 Index Admiral	8.00%
JPMorgan Large Cap Growth R6	8.00%
AB Discovery Value Z	4.00%
Hartford MidCap R6	4.00%
Franklin Small Cap Value R6	4.00%
Ivy Small Cap Growth N	4.00%
Invesco Real Estate R6	5.00%
Transamerica International Equity R6	4.00%
Dodge & Cox International Stock	4.00%
Oppenheimer International Growth I	4.00%
Columbia Emerging Markets Inst3	3.00%
Merger Institutional	4.00%
AllianzGI Structured Return R6	4.00%
AB Global Bond Z	6.00%
AB High Income Z	4.00%
Prudential Total Return Bond Q	6.00%
Transamerica Short-Term Bond R6	8.00%
Oppenheimer Senior Floating Rate I	4.00%
Federated Government Obligs Instl	4.00%

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM  
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**ACCUMULATED PLAN BENEFITS UNDER FASB ASC 960**

Actuarial Present Values of Accumulated Plan Benefits (Accumulated Benefit Obligation):	<u>1/1/2017</u>	<u>1/1/2018</u>
Vested Benefits		
Participants currently receiving payments	68,983,539	67,176,971
Other Participants		
Active Employees	0	0
Deceased and Disabled Employees	0	0
Deferred Vested Terminated Employees	0	<u>0</u>
Total - Other Participants	<u>0</u>	<u>0</u>
Total Vested Benefits	68,983,539	67,176,971
Nonvested Benefits	<u>0</u>	<u>0</u>
Total Actuarial Present Values of Accumulated Plan Benefits	68,983,539	67,176,971
Statement of Changes in Actuarial Present Value of Accumulated Plan Benefits		
Actuarial Present Value of Accumulated Plan Benefits - 1/1/2017		68,983,539
Increase (Decrease) Attributable to:		
Interest Due to Change in the Discount Period		4,601,713
Benefits Paid		(6,601,229)
Assumption Change		860,918
Plan Amendment		0
Benefits Accumulated and Actuarial Experience Different From That Assumed		<u>(667,970)</u>
Actuarial Present Value of Accumulated Plan Benefits - 1/1/2018		67,176,971
Discount Rate	7.00%	7.00%