



City of Franklin Employees' Pension Plan and Trust

Actuarial Valuation and Report

January 1, 2019

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Introduction

An actuarial valuation of the City of Franklin Employees' Pension Plan and trust was performed as of January 1, 2019. The last valuation performed was as of January 1, 2018. The purpose of the valuation was to determine the current funding status of the Plan, with the intention that funding levels indicated by the valuation be used as the basis for contributions to the Plan for the fiscal year commencing January 1, 2020.

Actuarial valuations are based on the integrity of employee data, plan asset data, plan provisions and an extensive set of assumptions regarding future events. There is necessary uncertainty with any actuarial calculation based on the accuracy of the data provided, the correct interpretation of plan provisions and the Accuracy of the assumptions made. These results were based on participant data provided by the City and asset information provided by the Trustee. This information was not audited but was reviewed for reasonableness.

This valuation was prepared on the basis of the interest, salary and demographic assumptions that were determined from the Experience Study for the period January 1, 2014 to December 31, 2018 prepared by Findley and approved by the Board for use beginning with the January 1, 2019 actuarial valuation. These assumptions will remain in effect for valuation purposes until such time as the Board adopts revised assumptions, which is scheduled to be performed before the January 1, 2023 valuation.

This is the first valuation prepared by Findley. Prior year Valuations were completed by another actuary. The prior year results were matched within reasonable tolerance pursuant to the actuarial standards of practice.

A detailed explanation of the actuarial assumptions and methods used in the report are contained in the Basis of Valuation section. Also included in the Basis of Valuation section of this report is a summary of provisions of the plan as we understand them.

Purpose and Use

This report has been prepared exclusively for the City of Franklin Employees' Pension Plan and Trust. The calculations reported herein have been made on a basis consistent with our understanding of the statements. Findley is not responsible for consequences resulting from the use of any part of this report without prior authorization or approval. This report provides actuarial advice and does not constitute legal, accounting, tax or investment advice. Determinations for other purposes, such as funding, bond ratings, or judging benefit security, may be significantly different from the results shown in this report.

Actuarial findings in this report are based on actuarial assumptions which reflect expected plan experience. Although the deviation of the actual future plan experience and the expected experience inherently creates some uncertainty with the results, in our opinion the actuarial assumptions reasonably reflect the expected future experience of the plan. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. All of these factors can result in the risk of volatility in the Net Pension Liability over time.

Notes about Participant Data

The actuarial valuation underlying this report has been made utilizing employee data furnished by the employer. While we have analyzed this information and found no material limitations, please note that a complete and independent audit of these data was not performed.

Actuarial Certification

The actuarial valuation summarized in this report is based on the employee data provided by City of Franklin Employees' Pension Plan and trust information provided by the trustee. The employee data has been reviewed for consistency. The trust information in this report has not been audited but appears to accurately reflect the assets of the plan. The information in this report has been prepared under the supervision of S. Kevin Sullivan, a member of the Academy of Actuaries, Fellow of the Society of Actuaries, and a consulting actuary with Findley, Inc., who has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions herein. To the best of our knowledge the information has been prepared in accordance with generally accepted actuarial standards, including the overall appropriateness of the analysis, assumptions, and results and conforms to appropriate Standards of Practice as promulgated from time to time by the Actuarial Standards Board, which standards form the basis for the information in this report. We are not aware of any direct or material indirect financial interest or relationship, including investment management or other services that could create, or appear to create, a conflict of interest what would impair the objectivity of our work.



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June 26, 2019

Date

Summary of Report

Funding requirements

An actuarial valuation of the City of Franklin Employees' Pension Plan and trust was conducted as of January 1, 2019. The purpose of the valuation is to determine the cost implications of the pension plan including a determination of annual funding levels for the plan year ending December 31, 2020.

On the basis of the valuation, it has been determined that the annual funding levels for the 2020 plan year, as described in the basis of the valuation section of this report, are as follows:

	Total Amount	Percentage of Payroll
Recommended Funding Level	\$ 5,988,709	18.84%

The following summarizes pertinent comparative statistics from the current and previous valuations:

	Valuation Date		
	1/1/2019	01/01/2018	% Increase
Number of Employees	494	519	(4.82%)
Total Covered Payroll	\$ 31,795,391	\$ 31,118,096	2.18%
Average Salary	\$ 64,363	\$ 59,958	7.35%
Average Age	46.41	45.53	1.93%
Average Past Service	13.41	12.48	7.45%
Recommended Funding Level	\$ 5,988,709	\$ 4,254,456	40.76%
% of Payroll	18.84%	13.67%	37.76%

Yearly comparison of selected plan information

	Plan Year		
	2019	2018	2017
Number of Participants			
Active	494	519	554
Deferred Vested	178	172	164
Retired and Disabled	223	210	189
Annual Covered Payroll	\$ 31,795,391	\$ 31,118,096	\$ 30,904,891
Average Annual Earnings	\$ 64,363	\$ 59,958	\$ 55,785
Present Value of Benefits	\$ 157,975,987	\$ 145,013,271	\$ 131,394,687
Unfunded Supplemental Liability	\$ 37,903,829	\$ 23,680,756	\$ 25,412,681
Actuarial Asset Value	\$ 104,845,757	\$ 108,421,369	\$ 93,312,443
Annual Funding Levels			
Normal Cost	\$ 2,438,659	\$ 2,017,416	\$ 1,894,635
Normal Cost Rate	7.67%	6.48%	6.13%
Expected Employee Contribution	\$ (343,831)	\$ (331,592)	\$ (344,024)
Net Normal Cost	\$ 2,094,828	\$ 1,685,824	\$ 1,550,611
Net Normal Cost % of Payrol	6.59%	5.42%	5.02%
Recommended Contribution	\$ 5,988,709	\$ 4,254,456	\$ 4,205,916
% of Payroll	18.84%	13.67%	13.61%
Present Value of Accrued Benefits	\$ 114,393,433	\$ 110,751,244	\$ 100,182,076
Security Ratio	91.65%	97.90%	93.14%

Funding Issues

The investment return for the period ending January 1, 2019 was (3.06%); the assumed rate of return was 7.40%. This resulted in a \$10,404,469 investment loss based on the investment return assumption.

Contribution Components under the Plan

Plan benefits are being funded by actuarially determined contributions and investment income from plan assets. Unfunded liabilities are amortized as described below.

Description of Actuarial Funding Method

The employer contribution and plan liabilities are determined under the Entry Age Normal Funding Method.

A detail description of the Method followings:

The Normal Cost is the annual amount that would have to be paid for each member from the original date of entry (employment) to his assumed retirement (termination, disability, or death) date in order to fund his projected benefits, over the whole of his working life (membership in the plan). This computation is made in such a way that each year's annual payment is a level percent of participants' compensation.

The unfunded (surplus) / liability is determined by calculating the Present Value of Projected Benefits at the Valuation date and subtracting the Present Value of Future Normal Costs the assets of the Fund.

A past service cost (amortization payments) is calculated as the amount necessary to fund the Initial Unfunded Actuarial Accrued Liability plus any changes in the Unfunded Actuarial liability due to experience gains and losses.

Accrued Liability due to plan changes, assumption changes, or actuarial experience gains / (losses), together with interest thereon, in equal installments as required by regulations. See amortization Schedule section.

The recommended City's contribution is the Normal Cost plus the Past Service Contribution with interest to expected date(s) of the contributions(s).

Actuarially Determined Contributions

For the fiscal year ending December 31, 2019, the actuarially determined contribution is \$4,254,556. The City of Franklin contributed \$4,254,556 for the fiscal year ending December 31, 2019, which satisfies the requirement to fund at least 100% of the actuarially determined contribution. The actuarially determined contribution for the fiscal year ending December 31, 2020 is \$5,987,033.

Basis of Valuation

Summary of provisions of the plan

This Summary is not a summary Plan Description or a Plan Document. You should not rely solely on this summary in making a determination of eligibility for the plan or its benefits.

Name of Plan

City of Franklin Employees' Pension Plan

Plan Sponsor & Plan Administrator

City of Franklin

Trustees

City of Franklin

City of Franklin Employee Pension and Trust Investment

Human Resources Director, two (2) members of the Board appointed by the Mayor, two (2) City Employee Representatives elected by the Employee population covered by this Plan, and two (2) Citizen Representatives who shall be appointed initially by the Mayor.

Effective Date

The Plan was originally established effective May 1, 1971. The restated Plan document is effective January 1, 2018. The latest amendment closed the Plan to new Participants, as of January 1, 2017.

Effective December 31, 2018, the Cash Balance must be taken as a single Lump Sum or as a Cash Refund Annuity. If you are not retired, you must take the account balance as of the date you retire. If you are retired, you must take the cash balance no later than April 1st, after you attain age 70.5.

Plan Year

The plan year is the calendar year.

Eligibility

A full-time employee who works 30 hours or more per week will become an active member on the first day of the month after meeting the following requirements:

- Completes one year of continuous service
- Reaches age 21
- An Employee hired on or after February 15, 2010, shall become eligible to participate in the Plan and become a Participant as of the first day of the month immediately following the commencement of the Employee's employment by the City, provided, however, that such Employee shall be eligible to participate in the Plan only upon his election to participate.

Effective January 1, 2017, the Plan is closed to new participants.

Credited Service

Credited Service under the Plan is based on completed calendar months during which an Employee has been in continuous employment with the City of Franklin. Periods of absence due to disability, military service, or approved leave are not considered discontinuance of employment.

Plan Compensation

Plan Compensation is W-2 Compensation, including deferrals made under this Plan as mandatory pre-tax employee contributions, any amounts made under a cafeteria (§125) plan, overtime pay, bonuses, holiday pay, fringe benefits (cash or non-cash), deferred compensation, welfare benefits, and other regular pay.

Compensation excludes reimbursements or other expense allowances, moving expenses, uniform allowances, and supplemental pay for police officers and firefighters, long-term disability benefits, pay in-lieu-of notice, severance pay, tuition reimbursements, or automobile allowances.

On November 17, 2016, the City approved the creation of a Retirement Health Savings (RHS) Plan that is exempt from income tax when disbursements are made for medical expenses and related health insurance payments and premiums. The initial phase of the RHS plan includes the City Administrator, Assistant City Administrators, and Department Directors. Funds contributed to the RHS plan are not considered wages in pension benefit calculations.

Average Compensation

"Average Compensation" shall mean the average of the Participant's Compensation over the three (3) consecutive whole calendar years of a Participant's Employment during which his Compensation was the greatest out of the last ten (10) calendar years, or over a lesser number of Years of Employment actually served provided, however, that for a Participant who was first hired by the City on or after February 15, 2010, "Average Compensation" shall mean the average of the Participant's Compensation over the five (5) consecutive whole calendar years of a Participant's Employment during which his Compensation was the greatest out of the last ten (10) calendar years or over a lesser number of Years of Employment actually served.

Accrued Benefit

The Accrued Benefit is determined in the same manner as Normal Retirement Benefit using Average Compensation and Service at date of determination.

Participants' Cash Balance Accounts are the account balances on the date of determination.

Normal Retirement

Eligibility

Normal retirement occurs at age 65 and completion of 5 years of Plan participation. With respect to employees hired before July 1, 2006, normal retirement occurs when they complete 25 years of service.

Benefit

For employees hired before July 1, 1995, the benefit formula is the greater of

- 2.00% of Average Compensation multiplied by the number of years of Credited Service, less 50.00% of the monthly Primary Insurance Amount provided under Social Security at the time of retirement, or
- 1.00% of Average Compensation multiplied by the number of years of Credited Service.

For all retirements and terminations after July 1, 2003, the benefit formula is 2.00% of Average Compensation multiplied by the number of years of Credited Service.

Cash Balance Accounts

Cash Balance Accounts include the sum of all pre-tax employee contributions, post-tax employee contributions, discretionary City contributions, and interest credits.

Early Retirement

Eligibility

Completion of ten years of Credited Service and attainment of age 55, or completion of 25 years of Credited Service regardless of age.

Benefit

The benefit is determined under the Accrued Benefit formula stated above, which is based on service and compensation to date, and is payable at age 65. A reduced benefit is payable immediately. The reduction for immediate commencement of benefits is 5% per year for each year preceding normal retirement with a prorated adjustment for partial years, rounded to the nearest month. A participant hired before February 15, 2010 who has attained age 62 with twenty years of Credited Service will receive an Early Retirement Benefit without reduction.

Participants hired after July 1, 2006 and before February 15, 2010 can retire after age 55 with at least 25 year of service with no reduction for early retirement.

Participant's Cash Balance Accounts are the account balances on the Early Retirement Date.

Late Retirement

Benefit

The late retirement benefit is the greater of the benefit determined under Normal Retirement above calculated as of the Normal Retirement Date actuarially increased to the late retirement date, or the benefit determined under Normal Retirement above recognizing pay and service to the late retirement date.

Participants' Cash Balance Accounts are the account balances on the actual Retirement Date.

Disability Retirement

Eligibility

A participant must be totally and permanently disabled.

Benefit

The benefit is the accrued retirement benefit reduced for early payment or deferred to age 65 if the participant is not otherwise eligible to receive a benefit.

Vesting

A participant will be vested in his Accrued Benefit according to the following schedule adopted after January 1, 2003.

<u>Credited Service</u>	<u>Vested Percentage</u>
Less than 5 years	0%
5 years	100%

A participant is 100% vested immediately in all Cash Balance Accounts.

Death Before Retirement

Eligibility

Attainment of age 21 and one year of Credited Service is required to be eligible for this benefit upon death.

Benefit

The beneficiary receives the monthly benefit that can be provided by the actuarial present value of the accrued benefit. If the employee dies before becoming eligible for Early Retirement, the beneficiary may receive a Lump Sum equal to the actuarial present value of the accrued benefit.

Death After Retirement

No benefit is payable unless an optional form of settlement has been elected. Otherwise, the benefit is the employee's contributions, plus interest, less the amount of annuity payments paid.

Annuity Forms

The following forms are available:

Normal Form

- The normal form for the monthly benefit is a life annuity benefit. However, each participant married at retirement who does not elect otherwise will receive a joint annuity in a reduced amount providing for a 50% continuation to a surviving spouse.
- The normal form for the Cash Balance Accounts is a lump sum. However, it may be converted to an annuity payable for life with a death benefit refund of the account at the Participant's Retirement Date, minus the sum of the monthly payments that have been made.

Optional Forms

- Contingent options at 50%, 75%, or 100% of the benefit being paid to the beneficiary upon death of the retiree
- Five, ten, and fifteen year certain and life annuities
- Social Security adjustment option
- Special option upon request and granted by the City

Contributions

Mandatory Participant Contributions

Employees that elect to participate, who were first hired by the City on or after February 15, 2010, shall make a mandatory contribution to the Plan in an amount equal to 5% of the Participant's Compensation. Employees are 100% vested in total accumulated contribution without interest.

Pre-Tax Employee Contributions

Employees hired before July 1, 1995 may contribute from 3.00% to 10.00% on a pre-tax basis to a Cash Balance Account. For employees hired on or after July 1, 1995, a 3.00% pre-tax contribution is required, but an additional contribution up to 7% may be made if elected on a one-time basis.

Post-Tax Employee Contributions

Employees may make a voluntary after-tax contribution of 1.00% to 10.00% of annual salary to a Cash Balance Account.

Discretionary City Contributions

The City may make additional contributions to Participants' Cash Balance Accounts on a discretionary basis.

Regular City Contributions

The City will make regular contributions as required to fund the Plan.

Interest on Cash Balance Accounts will be credited each year with interest calculated at the rate for U.S. Treasury Bills as of November 1, of the previous year plus 1.00%. The minimum interest to be credited will be no less than 6.00% per year.

The Historical Cash Balance interest crediting rates are:

<u>Year</u>	<u>Rate</u>
1995	9.08%
1996	7.26%
1997	7.48%
1998	7.11%
1999	6.25%
2000	7.15%
2001	6.78%
2002	6.12%
2003	6.00%
2004	6.12%
2005-2018	6.00%

Summary of actuarial assumptions and methods

Mortality Rates

105% of the RP-2014 Healthy Annuitants and Non-Annuitants, Blue Collar Mortality Tables, Adjusted back to 2006, Separate for Males and Females.

Withdrawal Rates

- **Tier I and Tier III** – The Basic Age Table - 2003 SOA Pension Plan Turnover Study
- **Tier II and Tier IV** – 115% of The Basic Age Table - 2003 SOA Pension Plan Turnover Study

Disability Rates/Disabled Mortality/Recovery Rates

100% of UAW table for Males and Females

Salary Scale

Sample rates are shown below:

<u>Age</u>	<u>Rate</u>
25	7.50%
30	7.00%
35	6.00%
40	5.00%
45	4.50%
50	4.00%
55	3.50%
60+	3.00%

Rate of Investment Return

Prior to January 1, 2018 – 7.50% per annum

January 1, 2018 – 7.40% per annum

January 1, 2019 – 7.30% per annum

Rate of Retirement

Active Participants are assumed to retire Based on the following:

Tier I - General Service

Age	Under 5	5-6	7-19	20-24	25 & Over
<40	0.00%	0.00%	0.00%	0.00%	0.00%
40-49	0.00%	0.00%	5.00%	5.00%	10.00%
50-54	0.00%	0.00%	5.00%	5.00%	20.00%
55	0.00%	0.00%	5.00%	5.00%	10.00%
56	0.00%	0.00%	5.00%	5.00%	10.00%
57-61	0.00%	0.00%	5.00%	5.00%	10.00%
62	0.00%	0.00%	25.00%	50.00%	50.00%
63-64	0.00%	0.00%	15.00%	25.00%	40.00%
65	0.00%	15.00%	40.00%	40.00%	40.00%
66-69	0.00%	20.00%	20.00%	40.00%	40.00%
70+	0.00%	100.00%	100.00%	100.00%	100.00%

Tiers II & III - General Service

Age	Under 5	05-Jan	19-Jun	20-24	25+
<55	0.00%	0.00%	0.00%	0.00%	0.00%
55	0.00%	0.00%	10.00%	10.00%	12.50%
56	0.00%	0.00%	5.00%	5.00%	10.00%
57-59	0.00%	0.00%	5.00%	5.00%	7.50%
60-61	0.00%	0.00%	5.00%	5.00%	12.50%
62	0.00%	0.00%	25.00%	50.00%	50.00%
63-64	0.00%	0.00%	15.00%	25.00%	25.00%
65-69	0.00%	50.00%	50.00%	50.00%	50.00%
70+	0.00%	100.00%	100.00%	100.00%	100.00%

Rates of Retirement (continued)

Tier I - Police / Fire								
Service								
Age	Under 10	10-19	20-24	25	26	27	28	29 & Over
Under 40	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
40-49	0.00%	0.00%	0.00%	0.00%	0.50%	0.50%	0.50%	0.50%
50	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	2.00%	2.00%
51	0.00%	0.00%	0.00%	20.00%	20.00%	40.00%	40.00%	40.00%
52	0.00%	0.00%	0.00%	20.00%	20.00%	60.00%	60.00%	60.00%
53	0.00%	0.00%	0.00%	20.00%	20.00%	60.00%	80.00%	80.00%
54	0.00%	0.00%	0.00%	20.00%	20.00%	60.00%	80.00%	80.00%
55	0.00%	10.00%	10.00%	40.00%	60.00%	80.00%	80.00%	80.00%
56-61	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	80.00%	80.00%
62	0.00%	25.00%	50.00%	50.00%	50.00%	60.00%	80.00%	80.00%
63-64	0.00%	15.00%	25.00%	40.00%	20.00%	40.00%	60.00%	80.00%
64-69	0.00%	40.00%	40.00%	50.00%	20.00%	40.00%	60.00%	80.00%
70+	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Tiers II & III - Police / Fire									
Service									
Age	Under 5	5-9	10-14	20-24	25	26	27	28	29 & Over
<55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55	0.00%	0.00%	1.00%	10.00%	20.00%	20.00%	20.00%	20.00%	20.00%
56	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	40.00%	40.00%	40.00%
57	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	60.00%	60.00%
58	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	80.00%	80.00%
59	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	8.00%	100.00%
60	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	80.00%	100.00%
61	0.00%	0.00%	5.00%	5.00%	20.00%	40.00%	60.00%	80.00%	100.00%
62	0.00%	0.00%	25.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
63-64	0.00%	0.00%	15.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
65-68	0.00%	50.00%	50.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
69	0.00%	10.00%	10.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
70+	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Valuation method

Entry Age Normal with the unfunded liability reestablished each year

Amortization method

Level Percent of Salary amortization of unfunded liabilities

Provision for Expenses

The expenses are reflected in the interest funding rates.

Form of payment

Participants elect normal form of payment.

Marriage assumptions

100% of both males and females are assumed to be married with husbands 3 years older than their wives.

Other assumptions

Deferred vested participants are assumed to commence at age 65.

Disabled participants are assumed to commence at age 55.

Amortization Period

20 Years Closed Period

Asset valuation method

The asset valuation is equal to the Market value of assets plus any employee and / or employer contributions made for the plan year. The asset information is provided by the City of Franklin, US Bank and Trust and Dahab Associates. The asset amount used in this report was approved by the City.

Changes in Assumptions and Method from prior actuarial valuation

The following assumptions were changed beginning with the January 1, 2019 valuation.

The interest rate assumption has been changed from that used in the prior year report. The change is as follows:

	Prior Year	Current Year
Valuation Rate	7.40%	7.30%
Investment Rate of Return	7.40%	7.30%

Reason: Effective with the 2018 valuation, the City of Franklin has committed to reduce the investment rate of return assumption by 10 basis points each year until the investment rate reaches 7.00%; to better reflect plan's current and future rate of return expectations.

The Salary Increase assumption has been changed from that used in the prior year report. The change is as follows:

Prior Year	Current Year	
4.00%	Age	Rate
	25	7.50%
	30	7.00%
	35	6.00%
	40	5.00%
	45	4.50%
	50	4.00%
	55	3.50%
	60+	3.00%

Reason: Updated salary assumption to better recognize current and future salary increases.

The mortality actuarial assumption has been changed from that used in the prior year report. The change is as follows:

	Previous Year	Current year
Mortality Rates		
Healthy annuitants and Non-Annuitants	SOA-RP2000 Mortality Table for Males and Females	105% RP-2014 Blue Collar Mortality Tables for Males and Females adjusted back to 2006.
Disabled	PBGC Unhealthy Lives Mortality Tables for Males and Females adjusted back to 2006.	105% RP-2014 Blue Collar Mortality Tables for Males and Females adjusted back to 2006

Reason: Updated mortality tables to better recognize current and future mortality improvement.

The Withdrawal assumption has been changed from that used in the prior year report. The change is as follows:

	Prior Year	Current Year
Administrative Employees	Twice the T-3 Table Less the 1951 Group Annuity Table for Males and Females	The 2003 SOA Pension Plan Turn Over Study - Basic Age Table
Police and Fire Employees	Four times the T-3 Table Less the 1951 Group Annuity Table for Males and Females	115% of the 2003 SOA Pension Plan Turn Over Study - Basic Age Table

Reason: Updated Withdrawal rates to better recognize current and future Plan experience.

The Retirement assumption has been changed from that used in the prior year report. See Assumption section of the report for the new rates as of January 1, 2019.

Reason: updated Retirement rates to better recognize current and future Plan experience.

This is the first Findley has prepared this Valuation. Prior year Valuations were completed by another actuary. The prior year results were matched well within reasonable tolerance.

Plan Assets

Balance sheet

The following shows the market value of plan assets by asset for the current year and prior year.

Assets	Beginning of Year	End of Year
Total noninterest bearing cash	0	0
Receivables		
Employer contributions	2,235,961	1,063,614
Income	0	0
Other	0	0
Total Receivables	\$ 2,235,961	\$ 1,063,614
General investments		
Clearing Account	\$ 694,765	\$ 274,534
Other Clearing Account	0	0
Vanguard International Developing Countries	2,793,885	0
RMK Timber	1,294,468	0
FIA Timber	1,211,397	1,588,480
Landmark Private Equity	327,820	211,770
RMS Forest Timber	1,350,268	1,079,047
Hamilton Lane	2,356,634	1,864,068
State of Tennessee	96,156,171	97,772,705
BTG Select II	0	991,539
Total Assets	\$ 108,421,369	\$ 104,845,757
Employer related investments		
Employer securities	0	0
Employer real property	0	0
Buildings and other property used in plan operation	0	0
Total Assets	\$ 108,421,369	\$ 104,845,757
Liabilities		
Benefit claims payable	0	0
Operating payables	0	0
Other liabilities	0	0
Total Liabilities	\$ 0	\$ 0
Net Assets	\$ 108,421,369	\$ 104,845,757

Note: Totals may vary slightly due to rounding

Summary of Operation

Income				
Contributions				
Employer		3,190,842		
Participants		831,941		
Other		0		
	Total Contributions	0	\$	4,022,783
Interest		N/A		
	Total Interest	N/A	\$	0
Dividends		N/A		
	Total Dividends			\$0
Net gain (loss) on sale of assets		N/A		
	Gain (Loss)		\$	(3,237,304)
Unrealized appreciation (depreciation) of assets		0		
Other income		0		
Change in accrued income		0		
	Total Income		\$	785,479
Expenses				
Benefit payments				
Participants/beneficiaries		5,310,361		
Other payments		0		
	Total Payments	0	\$	5,310,361
Administrative expenses		114,344		
	Total Administrative Expenses		\$	114,344
	Total Expenses		\$	(5,424,705)
	Net Income		\$	(4,639,226)

Investment Return

The annualize dollar weighted rate of investment return on market values during the preceding years is set forth below:

Year End	Annualized Rate
December 31, 2018	(3.06%)
December 31, 2017	16.22%

Development of valuation Assets

The development of valuation assets as of January 1, 2019 for the plan is presented below:

Market Value Assets, January 1, 2019	104,845,757
Benefits Payable	0
Benefits Receivable	0
Fee Reversal	0
Valuation Assets	104,845,757

Reconciliation of Employee Contributions Cash Balance Account

	PreTax Contributions	Post Tax Contributions	Total
As of December 31, 2017	\$7,120,315	\$328,024	\$7,448,339
Employee Contributions	255,836	33,326	289,162
Interest Credited	413,582	19,075	432,657
Payouts	(610,457)	0	(610,457)
Adjustments (Cash Refund Annuity)	(73,150)	0	(73,150)
As of December 31, 2018	7,106,125	380,425	7,486,551

Mandatory Employee Contributions

	Total Accumulated	2018 Contribution
Tier 3 Employees	\$1,283,510	\$34,819
Tier 4 Employees	N/A	N/A

Actuarial Computations

Determination of Supplemental Liability

The unfunded actuarial accrued liability as of January 1, 2019 is determined as follows:

Entry Age Normal Past Service Liability as of January 1, 2019	\$	142,749,586
Trust Fund		104,845,757
Unfunded Supplemental Liability as of January 1, 2019	\$	37,903,829

Determination of Experience Gain or Loss as of January 1, 2019

Unfunded Actuarial Liability as of January 1, 2018	\$	23,680,756
Normal Cost for the prior plan year		2,017,416
Interest at the valuation rate		1,901,665
Employer contributions for the prior plan year		(5,111,355)
Cash balance increase with interest		293,467
Interest on the employer contributions		(58,064)
Expected Unfunded Actuarial Liability as of January 1, 2019	\$	22,723,885
Assumption Changes		1,191,865
Expected Unfunded Actuarial Liability after Changes	\$	23,915,750
Actual Unfunded Actuarial Liability as of January 1, 2019		37,903,829
Experience Gain or (Loss)	\$	(13,988,079)

Actuarial Balance Sheet

Actuarial Balance Sheet as of January 1, 2019

Assets

Trust Fund	\$	104,845,757
Unfunded Supplemental Liability		37,903,829
Present Value of Future Normal Cost		15,226,401
Total	\$	157,975,987

Liabilities

Present Value of Benefits		
Retired Participants	\$	60,541,783
Deferred Vested Participants		7,271,655
Active Participants		82,675,998
Cash Balance Account		7,486,551
Total	\$	157,975,987

Determination of Normal Cost

The Normal Cost attributable to the plan year commencing January 1, 2019 is determined as follows:

Entry Age Normal - Normal Cost	\$	2,438,659
Expected Employee Contributions	\$	(343,831)
Net Normal Cost	\$	2,094,828
Annual Payroll of Participants		31,795,391
Normal Cost Percentage		6.59%

Determination of Annual Funding levels

The recommended funding level is calculated as the sum of the normal cost for the plan year, plus amounts required to amortize the initial unfunded liabilities over 30 years plus experience gain/(loss) from the prior year.

		Recommended Funding Level
Normal Cost	\$	2,094,828
Amortization Charges		3,876,131
Amortization Credits		(232,605)
Interest at the Valuation Rate		250,356
Contribution Amount		\$5,988,709

Amortization Bases

Description	Year Established	Original Amount	Period Remaining	Prior Payment	Balance	Current Payment
2014 Unfunded Liability	01/01/2014	4,291,887	13	\$ 409,295	\$ 3,592,008	\$ 407,385
2015 Experience Loss	01/01/2015	3,768,423	16	341,847	\$ 3,378,206	339,934
2016 Experience Loss	01/01/2016	13,637,630	17	1,236,773	\$ 12,616,699	1,229,493
2017 Experience Loss	01/01/2017	4,381,222	18	397,218	\$ 4,170,162	394,768
2018 Change of Assumptions	01/01/2018	1,530,808	19	138,753	\$ 1,495,067	137,859
2019 Experience Loss	01/01/2019	13,988,079	20	N/A	13,988,079	1,259,384
2019 Change of Assumptions	01/01/2019	1,191,865	20	N/A	1,191,865	107,307
Total Charges					\$ 40,432,086	\$ 3,876,131

Weighted average amort period: 10.43104256 period: 17.55226469

Amortization Credit Bases

Description	Year Established	Original Amount	Period Remaining	Prior Payment	12/31/2018 Balance	Current Payment
2018 Experience Gain	01/01/2018	(2,342,428)	19	\$(212,318)	\$ (2,287,738)	\$ (210,951)
2019 Other	01/01/2019	(240,517)	20	N/A	\$ (240,517)	\$ (21,654)
Total Credits					\$ (2,528,255)	\$ (232,605)
Total					\$ 37,903,831	\$ 3,643,526

Analysis of Plan Experience

Experience gains and losses occur due to differences between anticipated and actual experience and may over significant periods of observation be important indicators of the accuracy of the actuarial assumptions used in determining contribution levels.

	<u>Gain/(Loss)</u>
Investment	(10,404,469)
Retirement Decrement	(1,072,897)
Termination Decrement	(3,127,470)
Disability	(95,061)
Retiree Mortality	870,910
Compensation Increase	(692,481)
Other Mortality	(100,842)
Transfers	(346,434)
Data Corrections	(293,467)
Liability remeasured	<u>1,274,132</u>
Total Gain/(Loss)	<u>(13,988,079)</u>

*The beginning of year liability is based on the new liability as calculated by Findley. January 1, 2019, is the first year Findley prepared this valuation. All prior year results were prepared by another actuary. The prior results were matched within reasonable tolerance.

Accrued Benefit Information

In the current regulatory environment, accrued benefit values are utilized for a number of purposes. Information is presented in this table to satisfy those requirements. A description of the terms used herein is set forth below.

Vested accrued retirement benefits are those benefits which each employee has earned as of the valuation date. Vested benefits are calculated in accordance with the normal, early and deferred vested retirement provisions of the plan. The value of these benefits is determined using the actuarial assumptions shown in Basis of Valuation section of this report, including mortality and retirement rates. Similarly, *accrued retirement benefits* are benefits which each employee has earned as of the valuation date without regard to plan vesting provisions. The basis for calculation of these benefits is similar to that of vested accrued retirement benefits except that values attributable to certain otherwise forfeitable benefits are also included.

The *accumulated benefit value* is the current value of accrued retirement benefits determined using the interest rate applied to determine funding requirements. This value is useful, in comparison to plan assets, in evaluating the progress of the funding policy.

Number of Members

Retired	191
Beneficiaries	29
Disabled	3
Deferred Vested	178
Active Fully Vested	412
Active Partially Vested	0
Active Nonvested	82

Total Annual Amount of Vested Accrued Benefits

Retired	5,362,620
Deferred Vested	1,653,300
Active Vested	N/A

**Accumulated
Benefit Value**

Applicable Interest Rate	7.30%
Present Value of Vested Accrued Benefits	
Retired	\$ 60,541,783
Deferred Vested	7,271,655
Active Vested	<u>35,158,034</u>
Total	\$ 102,971,472
 Present Value of Accrued Benefits	 \$ 114,393,433
 Market Value of Assets	 \$ 104,845,757

Accumulated Benefit Value Reconciliation

Presented below is a reconciliation of changes in accumulated benefit values during the prior year.

Accumulated Benefit Value, January 1, 2018	\$	110,751,244
Benefit accrual during the plan year		(1,430,449)
Benefit payments		(5,310,361)
Interest		7,999,109
Plan Amendments		0
Assumption Change		2,383,890
Accumulated Benefit Value, January 1, 2019	\$	114,393,433

Participant Data Reconciliation

		Active	Deferred Vested	Retired & Beneficiaries	Disabled
01/01/2018	Participants	519	172	207	3
	New Participants	10	0	0	0
	Vested Terminations	(12)	12	0	0
	Nonvested Terminations	(12)	0	0	0
	Retired	(12)	(5)	17	0
	Disabled	0	0	0	0
	Rehired	2	(1)	0	0
	Deceased	(1)	0	(4)	0
	Lump Sum Payments	0	0	0	0
	No Further Benefits	0	0	0	0
01/01/2019	Participants	494	178	220	3
Averages					
	Attained Age	46.41	50.88	66.78	69.99
	Past Service	13.41	N/A	N/A	N/A
	Average Salary	\$ 63,991	N/A	N/A	N/A
	Average Benefit Payment	N/A	\$774	\$2,021	\$512

Distribution of Active Participants' Earnings

Annual Earnings by Age

Age	TIER I			TIER II			TIER III			TOTAL		
	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings
Under 20	0	\$0	\$0	0	\$0	\$0	0	\$0	\$0	0	\$0	\$0
20-24	0	0	0	0	0	0	5	165,200	33,040	5	165,200	33,040
25-29	0	0	0	0	0	0	21	1,071,642	51,031	21	1,071,642	51,031
30-34	1	95,898	95,898	7	442,827	63,261	30	1,537,707	51,257	38	2,076,432	54,643
35-39	36	2,319,987	64,444	26	1,727,711	66,450	16	836,820	52,301	78	4,884,517	62,622
40-44	41	2,577,560	62,867	17	1,088,581	64,034	13	796,265	61,251	71	4,462,406	62,851
45-49	81	5,384,268	66,472	22	1,358,094	61,732	16	769,265	48,079	119	7,511,627	63,123
50-54	48	3,285,505	68,448	7	515,831	73,690	10	512,360	51,236	65	4,313,696	66,365
55-59	28	1,864,256	66,581	11	582,800	52,982	8	385,937	48,242	47	2,832,993	60,276
60-64	22	1,381,724	62,806	5	335,232	67,046	9	457,986	50,887	36	2,174,942	60,415
65-69	5	378,777	75,755	4	218,556	54,639	3	225,462	75,154	12	822,795	68,566
70-74	0	0	0	0	0	0	1	32,442	32,442	1	32,442	32,442
75-79	0	0	0	0	0	0	0	0	0	0	0	0
80 & Over	1	47,091	47,091	0	0	0	0	0	0	1	47,091	47,091
Total	263	\$17,335,066	\$65,913	99	\$6,269,632	\$63,330	132	\$6,791,084	\$51,448	494	\$30,395,782	\$61,530

Distribution of Active Participants' Earnings

Service	TIER I			TIER II			TIER III			TOTAL		
	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings	Number of People	Total Annual Earnings	Average Annual Earnings
Under 5	0	\$0	\$0	0	\$0	\$0	82	\$4,157,475	\$50,701	82	\$4,157,475	\$50,701
5-9	0	0	0	9	550,172	61,130	50	2,633,609	52,672	59	3,183,781	53,962
14-Oct	73	4,638,053	63,535	90	5,719,460	63,550	0	0	0	163	10,357,513	63,543
15-19	103	6,357,833	61,727	0	0	0	0	0	0	103	6,357,833	61,727
20-24	68	4,877,692	71,731	0	0	0	0	0	0	68	4,877,692	71,731
25-29	11	880,254	80,023	0	0	0	0	0	0	11	880,254	80,023
30-34	7	498,622	71,232	0	0	0	0	0	0	7	498,622	71,232
35-39	1	82,612	82,612	0	0	0	0	0	0	1	82,612	82,612
40 & Over	0	0	0	0	0	0	0	0	0	0	0	0
Total	263	\$17,335,066	\$65,913	99	\$6,269,632	\$63,330	132	\$6,791,084	\$51,448	494	\$30,395,782	\$61,530

Distribution of Active Participants

TIER I										
Years of Service										
AGE	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Over	TOTAL
Under 20	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
30-34	0	0	1	0	0	0	0	0	0	1
35-39	0	0	20	16	0	0	0	0	0	36
40-44	0	0	13	20	8	0	0	0	0	41
45-49	0	0	15	25	36	4	1	0	0	81
50-54	0	0	8	19	14	3	4	0	0	48
55-59	0	0	4	13	8	2	1	0	0	28
60-64	0	0	8	9	1	2	1	1	0	22
65-69	0	0	3	1	1	0	0	0	0	5
70-74	0	0	0	0	0	0	0	0	0	0
75 & Over	0	0	1	0	0	0	0	0	0	1
TOTAL	0	0	73	103	68	11	7	1	0	263

Distribution of Active Participants

TIER II										
Years of Service										
AGE	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Over	TOTAL
Under 20	0	0	0	0	0	0	0	0	0	0
20-24	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0	0
30-34	0	2	5	0	0	0	0	0	0	7
35-39	0	3	23	0	0	0	0	0	0	26
40-44	0	0	17	0	0	0	0	0	0	17
45-49	0	1	21	0	0	0	0	0	0	22
50-54	0	1	6	0	0	0	0	0	0	7
55-59	0	2	9	0	0	0	0	0	0	11
60-64	0	0	5	0	0	0	0	0	0	5
65-69	0	0	4	0	0	0	0	0	0	4
70-74	0	0	0	0	0	0	0	0	0	0
75 & Over	0	0	0	0	0	0	0	0	0	0
TOTAL	0	9	90	0	0	0	0	0	0	99

Distribution of Active Participants

TIER III										
Years of Service										
AGE	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Over	TOTAL
Under 20	0	0	0	0	0	0	0	0	0	0
20-24	5	0	0	0	0	0	0	0	0	5
25-29	19	2	0	0	0	0	0	0	0	21
30-34	21	9	0	0	0	0	0	0	0	30
35-39	7	9	0	0	0	0	0	0	0	16
40-44	10	3	0	0	0	0	0	0	0	13
45-49	3	13	0	0	0	0	0	0	0	16
50-54	5	5	0	0	0	0	0	0	0	10
55-59	4	4	0	0	0	0	0	0	0	8
60-64	5	4	0	0	0	0	0	0	0	9
65-69	2	1	0	0	0	0	0	0	0	3
70-74	1	0	0	0	0	0	0	0	0	1
75 & Over	0	0	0	0	0	0	0	0	0	0
TOTAL	82	50	0	132						

Distribution of Inactive Active Participants with Average Annual Benefit

Attained Age	Beneficiaries	Disabled	Retirees	Terminated Vested	Total
Under 45	3 \$2,031	0 \$0	0 \$0	55 \$9,457	58 \$9,073
45-49	0 \$0	0 \$0	1 \$22,379	33 \$10,057	34 \$10,419
50-54	1 \$2,024	0 \$0	15 \$38,938	27 \$9,553	43 \$21,165
55-59	1 \$11,012	0 \$0	29 \$42,570	20 \$9,320	50 \$30,601
60-64	2 \$6,560	0 \$0	31 \$31,788	28 \$8,496	61 \$20,269
65-69	7 \$16,067	1 \$5,096	56 \$21,581	10 \$8,774	74 \$19,106
70-74	4 \$10,574	2 \$6,660	36 \$21,476	5 \$6,263	47 \$18,299
75-79	4 \$3,574	0 \$0	11 \$16,877	0 \$0	15 \$13,329
80-84	4 \$19,630	0 \$0	7 \$14,957	0 \$0	11 \$16,656
85-89	3 \$9,611	0 \$0	4 \$23,554	0 \$0	7 \$17,578
90 & Over	0 0	0 0	1 4,422	0 0	1 4,422
TOTAL	29 \$10,643	3 \$6,139	191 \$26,315	178 \$9,288	401 \$17,473