TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES
Notice of Regular Meeting / Agenda

DATE: **Thursday, January 24, 2019**
TIME: **8:30 a.m.**
PLACE: **Human Resource Conference Room, 3rd floor East**
City Hall, 255 West Alameda
Tucson, Arizona 85701

A. **Consent Agenda**
1. Retirement Ratifications for January 2019
2. December 2018 TSRS Budget Vs. Actual Expenses
3. December 2018 Board Meeting Minutes
4. TSRS December Investment Measurement Service Monthly Review [Note 1]

B. **Call to Audience**

C. **Administrative Discussions**
1. Approval of Experience Report and 5-Year Assumptions
2. TSRS Rules and Regulations
3. Board Member Term Limits
4. Addition of Elected Retiree Board Member
5. TSRS FY 2018 Comprehensive Annual Financial Report

D. **Articles & Readings for Board Member Education / Discussion**
1. BofA – Managers Expect Economy to Slow, but See Chance of Recession As Slight
2. Infrastructure, Real Estate to Remain High on Investor Lists
3. Investors Shifting Focus to Bonds, Private Markets Away from Equities - Survey

E. **Future Agenda Items**
1. TSRS Rules and Regulations
2. Consideration for TSRS to Hire External Legal Counsel

F. **Adjournment**

Please Note: Legal Action may be taken on any agenda item

*****Pursuant to A.R.S. 38-431.03(A)(3) and (4): the board may hold an executive session for the purposes of obtaining legal advice from an attorney or attorneys for the Board or to consider its position and instruct its attorney(s) in pending or contemplated litigation. The board may also hold an executive session pursuant to A.R.S. 38-431.03(A)(1) for the discussion or consideration of matters specific to an identified public officer, appointee, or employee or pursuant to A.R.S. 38-431.03(A)(2) for purposes of discussion or consideration of records, information or testimony exempt by law from public inspection.

Note 1 – This item will be delivered on or before January 22, 2019

Service & Disability Retirements, End of Service Entrants for TSRS Board of Trustees Ratification

12/11/18 - 01/10/19 - January 2019

Name of Applicant	Department	Type	Effective Date	Date of Birth	Age	Credited Service	Present Value	Member's Accumulated Contributions	AFC	Option	Pension
David P Hitt	Parks & Recreation	Normal Retirement	12/22/2018	1/20/1955	63.92	17.7189	129,115.47	39,414.03	2,649.93	Single Life	1,056.46
Jose R Ortiz	Water	Normal Retirement	12/14/2018	3/31/1964	54.71	25.7177	335,970.68	100,970.55	4,128.36	J&S 75	2,238.18
Victoria M Bode	Police	Normal Retirement	1/5/2019	9/13/1952	66.31	34.8510	**	474,668.36	8,010.70	J&S 100	5,385.38
Javier V Montante	Environmental Services	Early Retirement	1/4/2019	8/14/1963	55.39	24.1475	**	95,822.90	4,239.07	J&S 100	2,062.34
Richard E Prater	Police	Normal Retirement	1/5/2019	3/22/1958	60.79	19.4673	**	135,101.17	5,762.62	J&S 100	2,319.53
Manuel S Padilla	Planning & Development	Normal Retirement	1/5/2019	12/14/1952	66.06	20.5588	**	101,651.30	5,257.64	Single Life	2,432.04
James D Castro Jr.	Transportation	Normal Retirement	1/5/2019	8/26/1952	66.36	31.1146	**	136,550.88	4,152.21	Single Life	2,906.87
Ruben J Rodriguez	Water	Normal Retirement	1/6/2019	1/27/1959	59.94	29.9760	**	179,206.58	4,930.35	J&S 50	3,124.57
Eugene E Mueller	General Services	Normal Retirement	1/9/2019	5/5/1956	62.68	22.7625	**	91,115.87	4,351.76	J&S 75	2,012.12
Cindy Stein	Public Safety Communications	Normal Retirement	1/9/2019	5/1/1962	56.69	23.3477	**	98,362.03	4,387.58	J&S 50	2,096.97
Source Material: GRS/Payroll									47,870.22		25,634.46
** Present value not available as first payment was made based on an estimate				**Averages**	61.28	24.97	232,543.08	145,286.37	4,787.02		2,563.45

Report ID : FIN-COT-BA-0001
Run Date : 01/15/2019
Run Time : 10:16 AM

City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Parameter Page

Parameters and Prompts

Fiscal Year	2019
Accounting Period	6
Fund	072
Department	*
Unit	*
Object Code	*

Report Description

The Expenses vs. Actual Report shows expenditures and encumbrances for the selected accounting period and for the selected fiscal year compared against the current expense budget and the unobligated budget balance. The report is sectioned by Department, Fund and Unit and summarized by Object.

Report ID : FIN-COT-BA-0001
Run Date : 01/15/2019
Run Time : 10:16 AM

City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9001 - Normal Retiree Benefit

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	5,637,403.93	5,637,403.93	0.00	33,754,346.68	33,754,346.68	72,000,000	38,245,653.32	53.12 %
Total for 100 - PAYROLL CHGS	**0.00**	**5,637,403.93**	**5,637,403.93**	**0.00**	**33,754,346.68**	**33,754,346.68**	**72,000,000**	**38,245,653.32**	**53.12 %**
Total for Unit 9001 - Normal Retiree Benefit	**0.00**	**5,637,403.93**	**5,637,403.93**	**0.00**	**33,754,346.68**	**33,754,346.68**	**72,000,000**	**38,245,653.32**	**53.12 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9003 - Normal Retiree Beneficiary Benefit

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	359,971.01	359,971.01	0.00	2,152,896.40	2,152,896.40	3,900,000	1,747,103.60	44.80 %
Total for 100 - PAYROLL CHGS	**0.00**	**359,971.01**	**359,971.01**	**0.00**	**2,152,896.40**	**2,152,896.40**	**3,900,000**	**1,747,103.60**	**44.80 %**
Total for Unit 9003 - Normal Retiree Beneficiary Benefit	**0.00**	**359,971.01**	**359,971.01**	**0.00**	**2,152,896.40**	**2,152,896.40**	**3,900,000**	**1,747,103.60**	**44.80 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9020 - Disability Retiree Benefit

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	164,711.14	164,711.14	0.00	1,000,895.12	1,000,895.12	2,100,000	1,099,104.88	52.34 %
Total for 100 - PAYROLL CHGS	**0.00**	**164,711.14**	**164,711.14**	**0.00**	**1,000,895.12**	**1,000,895.12**	**2,100,000**	**1,099,104.88**	**52.34 %**
Total for Unit 9020 - Disability Retiree Benefit	**0.00**	**164,711.14**	**164,711.14**	**0.00**	**1,000,895.12**	**1,000,895.12**	**2,100,000**	**1,099,104.88**	**52.34 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9021 - Pension Fund Administration

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES	0.00	26,328.55	26,328.55	0.00	125,614.19	125,614.19	276,420	150,805.81	54.56 %
102 - EXTRA TIME	0.00	1.17	1.17	0.00	2.17	2.17	0	(2.17)	0.00%
103 - OVERTIME WAGES	0.00	21.22	21.22	0.00	125.62	125.62	0	(125.62)	0.00%
105 - PAYROLL PENSION	0.00	3,971.22	3,971.22	0.00	3,971.22	3,971.22	0	(3,971.22)	0.00%
108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES	0.00	115.40	115.40	0.00	588.54	588.54	2,310	1,721.46	74.52 %
113 - TSRS PENSION CONTRIBUTION	0.00	7,237.12	7,237.12	0.00	34,477.52	34,477.52	76,010	41,532.48	54.64 %
114 - FICA (SOCIAL SECURITY)	0.00	1,950.07	1,950.07	0.00	9,928.93	9,928.93	20,090	10,161.07	50.58 %
115 - WORKERS COMPENSATION INSURANCE	0.00	142.06	142.06	0.00	824.07	824.07	4,500	3,675.93	81.69 %
116 - GROUP PLAN INSURANCE	0.00	3,356.82	3,356.82	0.00	15,523.35	15,523.35	27,000	11,476.65	42.51 %
117 - STATE UNEMPLOYMENT	0.00	28.90	28.90	0.00	147.41	147.41	380	232.59	61.21 %
125 - ONE-TIME DISTRIBUTION	0.00	0.00	0.00	0.00	6,000.00	6,000.00	0	(6,000.00)	0.00%
196 - INTERDEPARTMENTAL LABOR	0.00	8,000.00	8,000.00	0.00	48,000.00	48,000.00	96,000	48,000.00	50.00 %
Total for 100 - PAYROLL CHGS	**0.00**	**51,152.53**	**51,152.53**	**0.00**	**245,203.02**	**245,203.02**	**502,710**	**257,506.98**	**51.22 %**
202 - TRAVEL	0.00	2,670.80	2,670.80	0.00	5,423.59	5,423.59	4,000	(1,423.59)	-35.59 %
204 - TRAINING	0.00	120.00	120.00	0.00	122.00	122.00	14,000	13,878.00	99.13 %
205 - PARKING SERVICE	0.00	58.00	58.00	0.00	224.00	224.00	500	276.00	55.20 %
212 - CONSULTANTS AND SURVEYS	0.00	0.00	0.00	0.00	0.00	0.00	50,000	50,000.00	100.00 %
213 - LEGAL	0.00	12,286.50	12,286.50	0.00	12,286.50	12,286.50	50,000	37,713.50	75.43 %

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City of Tucson
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Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9021 - Pension Fund Administration

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
215 - AUDITING AND BANK SERVICES	0.00	0.00	0.00	0.00	2,050.00	2,050.00	60,000	57,950.00	96.58 %
219 - MISCELLANEOUS PROFESSIONAL SERVICES	0.00	13,005.00	13,005.00	0.00	1,132,453.35	1,132,453.35	9,900,000	8,767,546.65	88.56 %
221 - INSUR-PUBLIC LIABILITY	0.00	324.90	324.90	0.00	1,864.56	1,864.56	31,000	29,135.44	93.99 %
232 - R&M MACHINERY & EQUIPMENT	0.00	0.00	0.00	0.00	0.00	0.00	1,200	1,200.00	100.00 %
234 - COMPUTER HARDWARE MAINTENANCE	0.00	0.00	0.00	0.00	258.35	258.35	0	(258.35)	0.00%
245 - TELEPHONE	0.00	0.00	0.00	0.00	0.00	0.00	1,200	1,200.00	100.00 %
252 - RENTS EQUIPMENT	0.00	0.00	0.00	0.00	303.97	303.97	0	(303.97)	0.00%
260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS	0.00	38,000.00	38,000.00	0.00	38,000.00	38,000.00	51,000	13,000.00	25.49 %
263 - PUBLIC RELATIONS	0.00	0.00	0.00	0.00	0.00	0.00	2,560	2,560.00	100.00 %
284 - MEMBERSHIPS AND SUBSCRIPTIONS	0.00	0.00	0.00	0.00	0.00	0.00	1,500	1,500.00	100.00 %
Total for 200 - PROF CHARGES	**0.00**	**66,465.20**	**66,465.20**	**0.00**	**1,192,986.32**	**1,192,986.32**	**10,166,960**	**8,973,973.68**	**88.27 %**
311 - OFFICE SUPPLIES	0.00	341.00	341.00	0.00	656.90	656.90	9,000	8,343.10	92.70 %
312 - PRINTING,PHOTOGRAPHY,REPRODUCTION	0.00	0.00	0.00	0.00	1,086.15	1,086.15	9,000	7,913.85	87.93 %
314 - POSTAGE	0.00	3,985.92	3,985.92	0.00	4,176.11	4,176.11	12,000	7,823.89	65.20 %
317 - COMPUTER SOFTWARE < $100,000	0.00	71.91	71.91	0.00	71.91	71.91	0	(71.91)	0.00%
341 - BOOK, PERIODICALS AND RECORDS	0.00	0.00	0.00	0.00	0.00	0.00	250	250.00	100.00 %
345 - FURNISHINGS, EQUIPMENT AND TOOLS < $5,000	0.00	0.00	0.00	0.00	0.00	0.00	1,000	1,000.00	100.00 %
346 - COMPUTER EQUIPMENT < $5,000	0.00	0.00	0.00	0.00	1,764.33	1,764.33	1,000	(764.33)	-76.43 %

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9021 - Pension Fund Administration

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
359 - NON OFFICE SUPPLIES	0.00	35.41	35.41	0.00	92.13	92.13	0	(92.13)	0.00%
Total for 300 - SUPPLIES	**0.00**	**4,434.24**	**4,434.24**	**0.00**	**7,847.53**	**7,847.53**	**32,250**	**24,402.47**	**75.67 %**
Total for Unit 9021 - Pension Fund Administration	**0.00**	**122,051.97**	**122,051.97**	**0.00**	**1,446,036.87**	**1,446,036.87**	**10,701,920**	**9,255,883.13**	**86.49 %**

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Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9022 - Disability Retiree Beneficiary Benefit

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	34,734.26	34,734.26	0.00	208,405.56	208,405.56	370,000	161,594.44	43.67 %
Total for 100 - PAYROLL CHGS	**0.00**	**34,734.26**	**34,734.26**	**0.00**	**208,405.56**	**208,405.56**	**370,000**	**161,594.44**	**43.67 %**
Total for Unit 9022 - Disability Retiree Beneficiary Bene	**0.00**	**34,734.26**	**34,734.26**	**0.00**	**208,405.56**	**208,405.56**	**370,000**	**161,594.44**	**43.67 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9023 - ACTIVE MEMBER REFUNDS-CONTRBS

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	10,282.39	10,282.39	0.00	790,887.39	790,887.39	2,736,000	1,945,112.61	71.09 %
Total for 100 - PAYROLL CHGS	**0.00**	**10,282.39**	**10,282.39**	**0.00**	**790,887.39**	**790,887.39**	**2,736,000**	**1,945,112.61**	**71.09 %**
Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON	**0.00**	**10,282.39**	**10,282.39**	**0.00**	**790,887.39**	**790,887.39**	**2,736,000**	**1,945,112.61**	**71.09 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9025 - INTEREST ON REFUNDS

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	89.44	89.44	0.00	5,408.55	5,408.55	50,000	44,591.45	89.18 %
Total for 100 - PAYROLL CHGS	**0.00**	**89.44**	**89.44**	**0.00**	**5,408.55**	**5,408.55**	**50,000**	**44,591.45**	**89.18 %**
Total for Unit 9025 - INTEREST ON REFUNDS	**0.00**	**89.44**	**89.44**	**0.00**	**5,408.55**	**5,408.55**	**50,000**	**44,591.45**	**89.18 %**

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City of Tucson
Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9026 - DWE SYSTEM BENEFIT PAYMENT

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	0.00	0.00	0.00	63,844.27	63,844.27	200,000	136,155.73	68.08 %
Total for 100 - PAYROLL CHGS	**0.00**	**0.00**	**0.00**	**0.00**	**63,844.27**	**63,844.27**	**200,000**	**136,155.73**	**68.08 %**
Total for Unit 9026 - DWE SYSTEM BENEFIT PAYMENT	**0.00**	**0.00**	**0.00**	**0.00**	**63,844.27**	**63,844.27**	**200,000**	**136,155.73**	**68.08 %**

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Budget vs Actual Expenses
Through: December, 2019
For Fiscal Year 2019

Department 900 - TUCSON SUPPL RETIREMENT SYSTEM
Fund 072 - TUCSON SUPP RETIREMENT SYSTEM
Unit 9027 - CREDITABLE SERVICE TRANS(ASRS)

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	0.00	0.00	0.00	2,138.47	2,138.47	0	(2,138.47)	0.00%
Total for 100 - PAYROLL CHGS	**0.00**	**0.00**	**0.00**	**0.00**	**2,138.47**	**2,138.47**	**0**	**(2,138.47)**	**0.00%**
Total for Unit 9027 - CREDITABLE SERVICE TRANS(AS	**0.00**	**0.00**	**0.00**	**0.00**	**2,138.47**	**2,138.47**	**0**	**(2,138.47)**	**0.00%**
Total for Fund 072 - TUCSON SUPP RETIREMENT SYS	**0.00**	**6,329,244.14**	**6,329,244.14**	**0.00**	**39,424,859.31**	**39,424,859.31**	**92,057,920**	**52,633,060.69**	**57.17 %**
Total for Department 900 - TUCSON SUPPL RETIREME	**0.00**	**6,329,244.14**	**6,329,244.14**	**0.00**	**39,424,859.31**	**39,424,859.31**	**92,057,920**	**52,633,060.69**	**57.17 %**
Grand Totals	**0.00**	**6,329,244.14**	**6,329,244.14**	**0.00**	**39,424,859.31**	**39,424,859.31**	**92,057,920**	**52,633,060.69**	**57.17 %**

TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES
Meeting Minutes

DATE:	**Thursday December 20, 2018**
TIME:	**8:30 a.m.**
PLACE:	**Human Resource Conference Room, 3rd Floor East City Hall, 255 West Alameda Tucson, Arizona 85701**

Members Present:	Robert Fleming, Chairman Joyce Garland, Finance Director James Wysocki, Elected Retiree Representative Jorge Hernández, Elected Representative Ana Urquijo, HR Director
Staff Present	Art Cuaron, Pension & Benefits Administrator Tina Gamez, Administrative Assistant
Guests Present	Catherine Langford, Yoder & Langford – TSRS Legal Counsel (via telephone) Dave Deibel, Deputy City Attorney John O'Hare, CTRA Representative Mark Rubin, Constituent
Absent/Excused:	Michael Coffey, Elected Representative Kevin Larson, City Manager Appointee

Chairman Fleming called the meeting to order at 8:30am

A. **Consent Agenda (00:00-00:18)**
1. Retirement Ratifications for December 2018
2. November 2018 TSRS Budget Vs. Actual Expenses
3. October 2018 Board Meeting Minutes
4. November 2018 Board Meeting Minutes
5. TSRS November Investment Measurement Service Monthly Review [Note 1]

Chairman Fleming moved to approve the consent agenda passes unanimously (Kevin Larson & Michael Coffey absent/excused).

B. **Call to the Audience (00:18-02:00)**

John O'Hare spoke and distributed term limits for the Boards consideration.

Robert Fleming provided his resignation to the Board and informed the Board that Mark Rubin was appointed as the new chairman by the Mayor and Council on December 18, 2018. His term will take effect on January 1, 2019.

C. **Administrative Discussions (02:01-29:10)**
1. TSRS Rules and Regulations

Art Cuaron informed the Board that this item is a follow up from the October Retreat.

Catherine Langford, Yoder & Langford – TSRS Legal Counsel (via telephone) informed the Board of the changes of the prior Rules and Regulations and now is incorporating relevant TSRS polices and making it into one document and renaming it "Rules and Policies of the Board" that way it's easier to know where all documents reside.

Catherine Langford informed the Board that she revised Rule 7, 8 and 10.

Art Cuaron asked if the designees are permitted to vote. Catherine Langford informed the Board that the designees are full acting board members at the meetings they attend.

Board discussion ensued regarding designees of the Finance Director and Human Resources Director. Jim Wysocki and Jorge Hernandez want all board members to be treated the same with all proxy rights or no board members have any proxy rights. The Board agreed that the directors could send designees but those designees will not be permitted to vote and does not count as a quorum.

Rule 8 is pertaining to the meeting minutes. The Board indicated they are comfortable with the way the minutes are currently being presented.

Rule 9 is the restatement of the code provision of what is included in the budget. Catherine Langford stated she rewrote this to be more accurate.

Rule 10 is on disability. Catherine Langford added new additional information to this rule to more closely mirror the code.

Rule 11 will be reviewed and the Investment Policy Statement be brought back to the board in January. Chairman Fleming informed Catherine Langford that there was a typo on the governance policies. A finalized version of rules one through eleven will be brought to the board in January along with revisions of a few policies, such as the Investment Policy Statement. Art Cuaron informed the Board that when there is change to a policy document the board rules will have to be amended.

2. Approval of Asset/Liability Study **(29:10-31:12)**

Art Cuaron updated the Board on the contract with Callan regarding the Asset/Liability Study that will begin in March with anticipated completion in May. The Board adopted the renewal of a five year contract with Callan back during the summer but excluded this item from the contract as a means of obtaining a true cost for investment consultant services.

The fee to conduct the study totals $65,000, which was the same as amount quoted during the renewal. The contract has been reviewed and edited by external and internal legal counsel and the proposed edits have been accepted by Callan. Formal adoption of the contract is needed to authorize the project.

A motion to approve the Callan contract for the asset/liability study was made by Jim Wyscoki, 2nd by Jorge Hernandez. The motion passes unanimously (Kevin Larson & Michael Coffey absent/excused).

D. **Articles & Readings for Board Member Education / Discussion**

1. Institutional Investors Bracing for Continued Market Volatility in 2019
2. Market Volatility Didn't Bring Down DB Plan Funded Status in November
3. Public Sector Pensions Assume Record-High Investment Returns

E. **Future Agenda Items**

1. TSRS Rules and Regulations
2. Consideration for TSRS to Hire External Legal Counsel

F. **Adjournment**

Adjourned 9:02 AM

Mark Rubin Chairman of the Board	Date	Art Cuaron Pension & Benefits Administrator	Date

MEMORANDUM

DATE: January 17, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: Experience Study Results

Leslie Thompson, from Gabriel, Roeder, Smith & Company, will be here to present the results of the Actuarial Experience Study for the five-year period ending June 30, 2018. The current 5-year assumptions include a 7.25% discount rate and a wage growth rate of 3%. Study results and the actuarial recommendation are to adopt a new discount rate of 6.75% and wage growth of 3%.

As the Board will recall, direction was provided at the October Retreat for GRS to bring back projections based on the following 4 assumptions:

a) 7.00% discount rate, 3.00% wage growth
b) 7.00% discount rate, 2.75% wage growth
c) 6.75% discount rate, 2.75% wage growth
d) 6.75% discount rate, 2.50% wage growth

These scenarios and the impacts on the funded status of the plan will be presented in greater detail at the meeting.

The Board will need to adopt the Experience Study Report and assumptions for the next 5-year period.

Attachments: Draft Experience Study Report
Experience Study Presentation

Tucson Supplemental Retirement System

Actuarial Experience Study
for the Five-Year Period Ending June 30, 2018

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GRS Retirement Consulting

P: 720.274.7270 | F: 303.694.0633 | www.grsconsulting.com

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January 8, 2019

The Board of Trustees
Tucson Supplemental Retirement System
Tucson, Arizona

Subject: Results of the Actuarial Experience Study for the Five-Year Period Ending June 30, 2018

Dear Members of the Board:

We are pleased to present our report of the results of the Actuarial Experience Study for the Five-Year Period Ending June 30, 2018 for the Tucson Supplemental Retirement System ("TSRS"). Our report includes a discussion of the recent experience of the System, it presents our recommendations for new actuarial assumptions and methods, and it provides information about the actuarial impact of these recommendations on the liabilities and other key actuarial measures of TSRS.

With the Board of Trustees' approval of the recommendations in this report, we believe the actuarial condition of the System will be more accurately measured and portrayed.

This experience investigation study was conducted in accordance with generally accepted actuarial principles and practices, and in full compliance with the Actuarial Standards of Practice as issued by the Actuarial Standards Board. All of the undersigned are members of and meet the Qualification Standards of the American Academy of Actuaries.

We wish to thank the TSRS staff for their assistance in this project.

Respectfully submitted,

Leslie L. Thompson

Leslie Thompson, FSA, EA, MAAA
Senior Consultant

Dana Woolfrey

Dana L. Woolfrey, FSA, EA, MAAA
Consultant

Table of Contents

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SECTION A

EXECUTIVE SUMMARY

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Executive Summary

Our recommended changes to the key current actuarial assumptions and methods used in the valuations are summarized below. These recommendations are described in detail in Section C.

Economic assumptions

1. Based on current long-term forward-looking expectations, we recommend reducing the inflation assumption from 3.00% to 2.50%.
2. We recommend leaving the real rate of return assumption at 4.25%. This is based on the System's target asset allocation and real return expectations from a recent capital market survey of several investment consultants. Based on a recommended inflation rate of 2.50%, this results in a real return assumption of 6.75%.
3. Increase the productivity component of the salary scale assumption to 0.5%. Combined with the inflation rate of 2.50%, this creates an ultimate salary scale assumption of 3.00%. In accordance with the observed experience, slightly adjust the promotional/merit component of the salary scale.

Demographic assumptions

1. Update the mortality tables to the RP-2014 mortality tables (specific to healthy employees, healthy retirees, and disabled retirees for the pre-retirement, post-retirement and post-disablement assumptions, respectively) and a fully generational approach using the ultimate rates of the MP-2018 Projection Scales.
2. Slightly increased service-based termination rates for active members with less than five years of service. Increase age-based termination rates by 5% of current rates.
3. Slightly reduce early retirement and Rule of retirement rates. Modify age-based pattern of rates for those not qualifying for "Rule of" based on observed experience.

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SECTION B

INTRODUCTION

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Introduction

Summary of Process

A periodic review and selection of the actuarial assumptions is one of many important components of understanding and managing the financial aspects of TSRS. Use of outdated or inappropriate assumptions can result in understated costs which will lead to higher future contribution requirements or perhaps an inability to pay benefits when due; or, on the other hand, produce overstated costs which place an unnecessarily large burden on the current generation of members, employers, and taxpayers.

A single set of assumptions is typically not expected to be suitable forever. As the actual experience unfolds or the future expectations change, the assumptions should be reviewed and adjusted accordingly.

It is important to recognize that the impact from various outcomes and the ability to adjust from experience deviating from the assumption are not symmetric. Due to compounding economic forces, legal limitations, and moral obligations outcomes from underestimating future liabilities are much more difficult to manage than outcomes of overestimates, and that asymmetric risk should be considered when the assumption set, investment policy and funding policy are created. As such, the assumption set used in the valuation process needs to represent the best estimate of the future experience of the System and be at least as likely, if not more than likely, to overestimate the future liabilities versus underestimate them.

Using this strategic mindset, each assumption was analyzed compared to the actual experience of TSRS. Changes in certain assumptions and methods are suggested upon this comparison to remove any bias that may exist and to perhaps add in a slight margin for future adverse experience where appropriate. Next, the assumption set as a whole was analyzed for consistency and to ensure that the projection of liabilities was reasonable and consistent with historical trends.

The following report provides our recommended changes to the current actuarial assumptions.

In determining liabilities, contribution rates and funding periods for retirement plans, actuaries must make assumptions about the future. Among the assumptions that must be made are:

- Retirement rates
- Mortality rates
- Turnover rates
- Disability rates
- Investment return rate
- Salary increase rates
- Inflation rate

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For some of these assumptions, such as the turnover or retirement rates, past experience provides important evidence about the future. For other assumptions, such as the investment return rate, the link between past and future results is much weaker. In either case, though, actuaries should review their assumptions periodically and determine whether these assumptions are consistent with actual past experience and with future expectations.

In conducting experience studies, actuaries generally use data over a period of several years. This study is generally based on experience during the five-year period of July 1, 2013 to June 30, 2018. The last experience study was prepared in 2013, following completion of the June 30, 2013 actuarial valuation report. That report generally covered experience during the period of July 1, 2008 to June 30, 2013. This is necessary in order to gather enough data so that the results are statistically significant. In addition, if the study period is too short, the impact of the current economic conditions may lead to misleading results. It is known, for example, that the strength of the national and local economy can impact salary increase rates and withdrawal rates. Using results gathered during a short-term boom or bust will not be representative of the long-term economic trends.

Also, the adoption of new legislation that impacts benefits or compensation may cause a short-term distortion in the experience. For example, if an early retirement window were opened during the study period, we would usually see a short-term spike in the number of retirements followed by a dearth of retirements for the following two-to-four years. Using a longer period to observe the plan's experience reduces the influence of such short-term effects. On the other hand, using a much longer period may not immediately reflect real changes that may be occurring, such as mortality improvement or a change in the ages at which members retire. In our view, using a four-to six-year period appropriately balances these effects.

In an experience study, we first determine the number of deaths, retirements, etc. that occurred during the period. Then we determine the number expected to occur, based on the current actuarial assumptions. The number "expected" is determined from using the probability of the occurrence at the given age, times the "exposures" at that same age. For example, let's look at a rate of retirement of 50% at age 55. The number of exposures can only be those members who are age 55 and eligible for retirement at that time. Thus they are considered "exposed" to that assumption. Finally we calculate the A/E ratio, where "A" is the actual number (of retirements, for example) and "E" is the expected number. If the current assumptions precisely predicted the actual experience the A/E ratio would be 100%. When it varies much from this figure, it is a sign that new assumptions may be needed. Of course we not only look at the assumptions as a whole, but we also review how well they fit the actual results by sex, by age, and by service.

Please note it is often appropriate to graduate or smooth the results since the actual experience can be quite uneven from age to age or from service year to service year.

Please bear in mind that, while the recommended assumption set represents our best estimate, there are other reasonable assumptions sets that could be supported. Some reasonable assumption sets would show higher or lower liabilities or costs.

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Organization of Report

Section C contains our findings and recommendations for each actuarial assumption. The impact of adopting our recommendations on liabilities and contribution rates is shown in Section D. Section E summarizes the recommended changes. Section E presents a summary of all the actuarial assumptions and methods, including the recommended changes.

The exhibits in Section F should generally be self-explanatory. For example, on page 35, we show the exhibit analyzing the age-based termination rates for TSRS. The second column shows the total number of members who terminated during the study period. This excludes members who died, became disabled or retired. The third column, labeled “Exposures” shows the total exposures. This is the number of members who could have terminated during any of the years. On this exhibit, the exposures exclude anyone eligible for retirement. A member is counted in each year he could have terminated, so the total shown is the total exposures for the five-year period. The fourth column shows the probability of termination based on the raw data. That is, it is the result of dividing the actual number of terminations (col. 2) by the number exposed (col. 3). The fifth column shows the current termination rate and the sixth column shows the new recommended termination rate. Columns seven and eight show the expected numbers of terminations based on the current and proposed termination assumptions. Columns nine and ten show the Actual-to-Expected ratios under the current and proposed termination assumptions.

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SECTION C

ANALYSIS OF EXPERIENCE AND RECOMMENDATIONS

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Analysis of Experience and Recommendations

We will begin by discussing the economic assumptions: inflation, the investment return rate, the salary increase assumption, and the payroll growth rate. Next, we will discuss the demographic assumptions: mortality, disability, termination and retirement. Finally, we will discuss the actuarial methods used to calculate the liability, funded status, and contribution rate.

Actuarial Standards of Practice for Setting Economic Assumptions

Actuarial Standards of Practice (ASOP) No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, provides guidance to actuaries on giving advice on selecting economic assumptions for measuring obligations for defined benefit pension plans. ASOP No. 27 was revised and adopted by the Actuarial Standards Board (ASB) in September 2013 and supplements ASOP 4, Measuring Pension Obligations and Determining Plan Costs or Contributions.

As no one knows what the future holds, it is necessary for an actuary to estimate possible future economic outcomes. Recognizing that there is not one right answer, the current standard calls for an actuary to develop a reasonable economic assumption. A reasonable assumption is one that:

1. Is appropriate for the purpose of the measurement,
2. reflects the actuary's professional judgment,
3. takes into account historical and current economic data that is relevant as of the measurement date,
4. is an estimate of future experience; an observation of market data; or a combination thereof, and
5. has no significant bias except when provisions for adverse deviation or plan provisions that are difficult to measure are included.

However, the standard explicitly advises an actuary not to give undue weight to recent experience.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period. Generally, the economic assumptions are much more subjective in nature than the demographic assumptions.

Inflation rate

"Inflation," refers to price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions we employ. It impacts investment return, salary increases, and general payroll growth.

The chart on the following page shows the average annual inflation in each of the ten consecutive five-year periods over the last fifty years.

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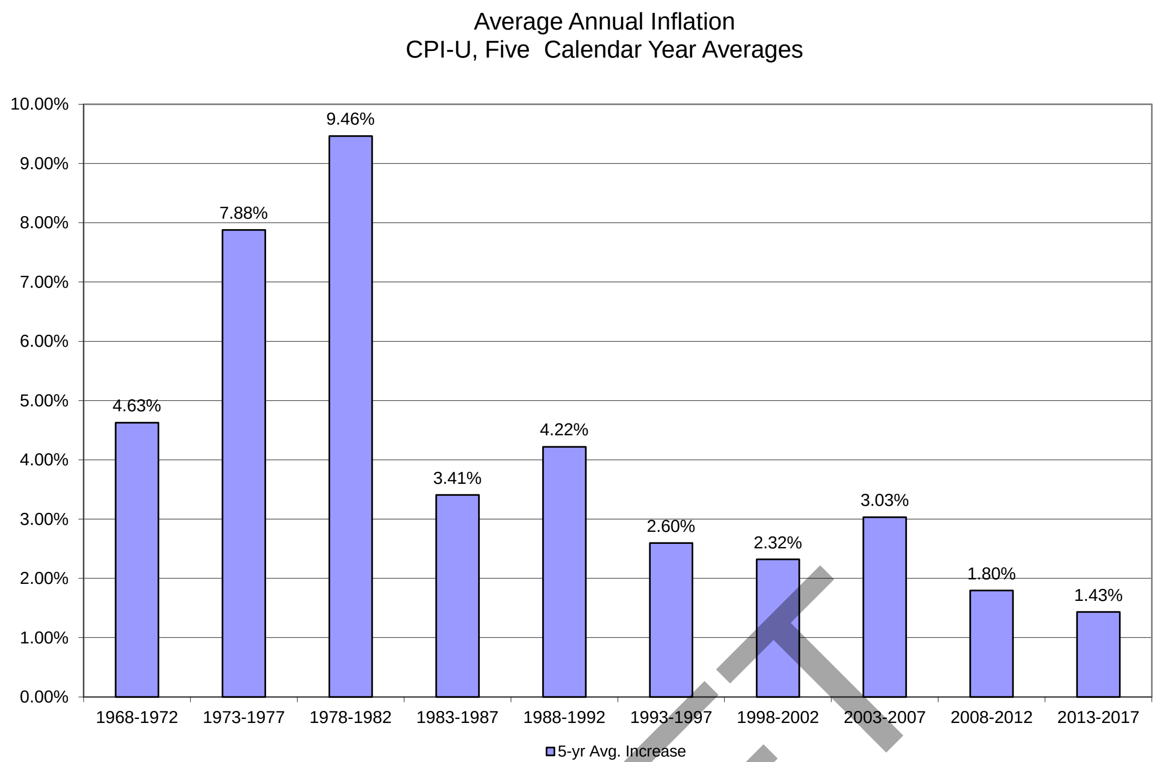

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

The table below shows the average inflation over various periods, ending December 2017:

Periods Ending Dec. 2017	Average Annual Increase in CPI-U
Last five (5) years	1.43%
Last ten (10) years	1.61%
Last fifteen (15) years	2.08%
Last twenty (20) years	2.14%
Last twenty-five (25) years	2.23%
Last thirty (30) years	2.56%
Since 1913 (first available year)	3.13%

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

As you can see, inflation has been relatively low, even over a longer period of 25 years. However, the prospective inflation rate is only weakly tied to past results.

Most investment consulting firms, in setting their capital market assumptions, currently assume that inflation will be less than 2.50%. We examined the 2018 capital market assumption sets for 11 investment consulting firms. The average assumption for inflation was 2.20%, with a range of 1.95% to 2.50%.

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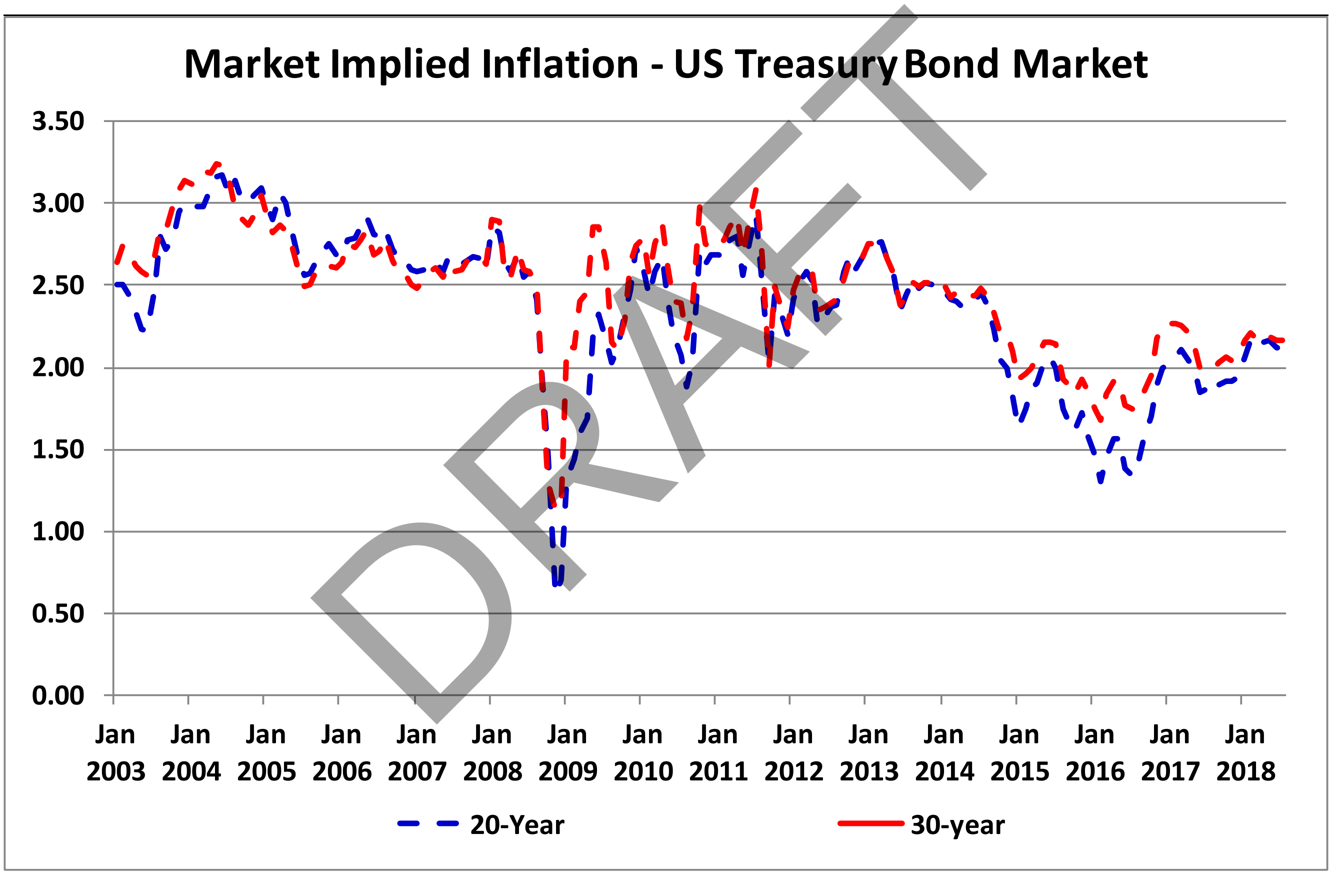
Forecasts from Social Security Administration

In the Social Security Administration's 2018 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.6% under the intermediate cost assumption. The low cost and high cost scenarios are 2.0% and 3.2%, respectively. All three of these numbers are unchanged from the prior year's report.

Expectations Implied in the Bond Market

Another source of information about future inflation is the market for US Treasury bonds. For example, the July 31, 2018 yield for 20-year inflation indexed Treasury bonds was 0.88% plus actual inflation. The yield for 20-year non-indexed US Treasury bonds was 3.03%. Simplistically, this means that on that day the bond market was predicting that inflation over the next twenty years would average 2.15% (3.03% – 0.88%) per year. The difference in yield for 30 year bonds implies 2.14% inflation over the next 30 years. This is consistent with most forecasts of inflation and overall economic growth continuing to be low. The chart below shows the historical market implied inflation from January 2003 through July 2018.



Historically, this has been a consistent predictor of future inflation. However, this analysis is known to be imperfect as it ignores the inflation risk premium that buyers of US Treasury bonds often demand as well as possible differences in liquidity between US Treasury bonds and TIPS.

Survey of Professional Forecasters and Fed Policy

The Philadelphia Federal Reserve conducts a quarterly survey of the Society of Professional Forecasters. Their most recent forecast (second quarter of 2018) was for inflation over the next ten years (2018 to 2027) to average 2.30%.

Additionally, the Federal Open Market committee (FOMC) targets a 2% Personal Consumption Expenditure (PCE) price index. Since 1992 the PCE averaged 1.8% while the CPI - U averaged 2.3%. The last 70 years saw a PCE of 3.1% and a CPI-U of 3.5%. Thus an inflation target of the PCE of 2% plus a margin to CPI - U of .5% would be in alignment with the historical differences of these metrics.

Recommendation

Because of the reduced inflation expectations, we recommend reducing the inflation assumption from 3.00% to 2.50%.

Investment and administrative expenses

Since the trust fund pays expenses in addition to member benefits and refunds, we must make some assumption about these. Almost all actuaries treat investment expenses as an offset to the investment return assumption. That is, the investment return assumption represents expected return after payment of investment expenses.

For investment expenses, investment consulting firms periodically issue reports that describe their capital market assumptions. The estimates for core investments (i.e., fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds that are net of investment related fees. The investment return expectations for the alternative asset class such as private equity and hedge funds are also net of investment expenses. Therefore, we did not make any adjustments to account for investment related expenses. Some of the Retirement Systems may also employ active management investment strategies that result in higher investment expenses compared to strategies that invest in passive index funds. We have assumed that active management strategies would result in the same returns, net of investment expenses, as passive management strategies.

For TSRS, the practice for administrative expenses has been to explicitly add a load onto the normal cost. This is also our preferred approach and we recommend continuing this practice. Using an explicit load onto the normal cost maximizes transparency, aligns better with the standards of the Governmental Accounting Standards Board, and maintains a parallel between the investment returns used by the investment consultant and the actuary.

The explicit load is based on actual administrative expenses paid in the prior year. The prior year's dollar amount is converted to a percentage of payroll based on valuation payroll.

Investment return rate

Currently, TSRS assumes an annual investment return rate of 7.25%. This is the rate used in discounting future benefit payments in calculating the actuarial present value of benefits as of the valuation date. Similar to the inflation assumption, past performance is not a reliable indicator of future performance, even when averaged over a long time period. Also, the actual asset allocation of the trust fund will significantly impact the overall performance, so returns achieved under a different allocation are not meaningful.

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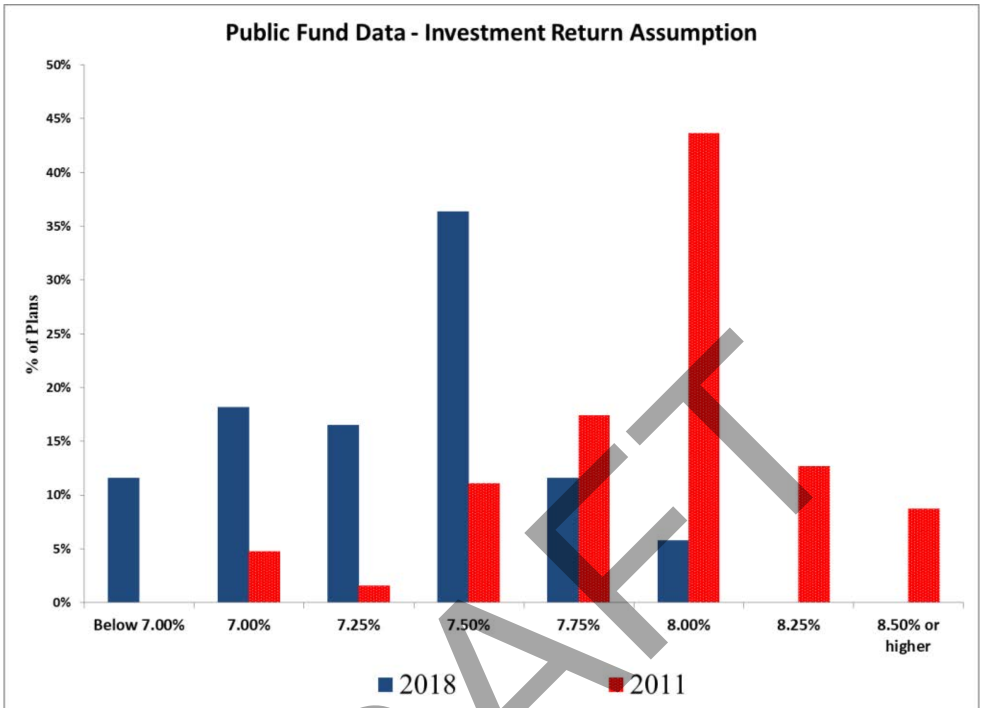
Assumption Comparison to Peers

We do not recommend the selection of an investment return assumption based on prevalence information. However, it is still informative to identify where the investment return assumption for TSRS is compared to its peers. The chart below shows the distribution of the investment return assumptions in the NASRA Public Fund Data as of July 2018.



We have included the same information from the 2011 survey to show the national trends in this assumption. The median rate of return is 7.46%. However, this chart does not tell the entire story. Several of the data points have not been examined in a few years, meaning even the current survey data is somewhat dated. The following chart includes a subset of the current survey that only includes systems that we can confirm have performed experience studies in the last 2 years:

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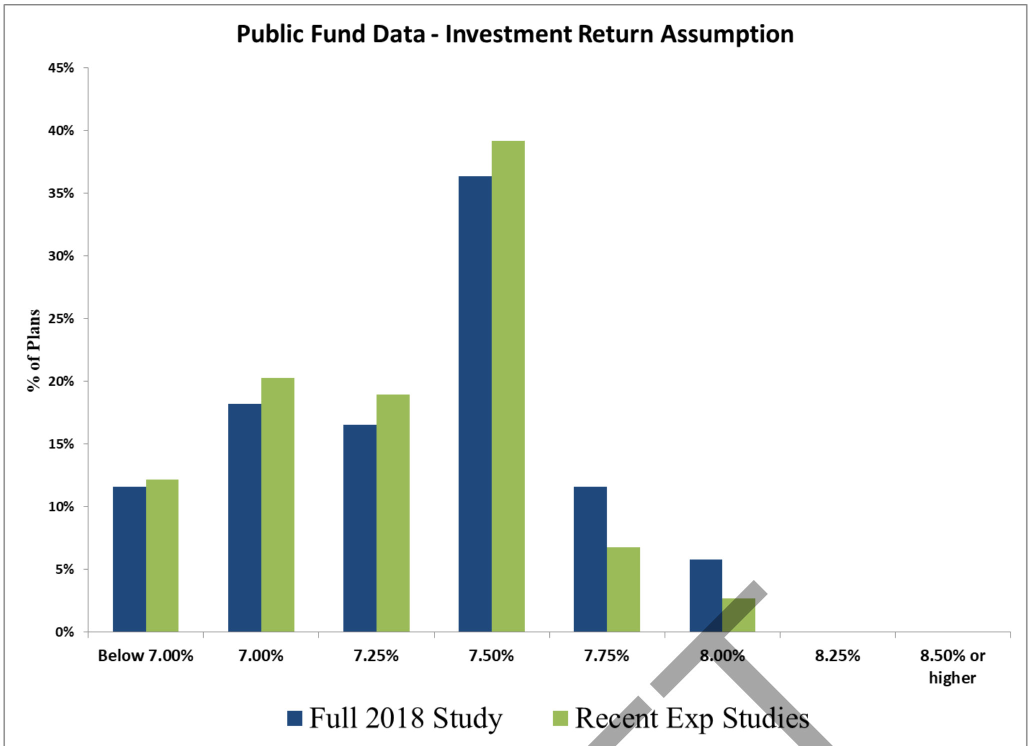

For recent experience studies, the median assumption has been closer to 7.33%.

<u>Asset Allocation</u>

The actual asset allocation of the trust fund will significantly impact the overall performance, so returns achieved under a different allocation are not meaningful. More importantly, the real rates of return for many asset classes, especially equities, vary so dramatically from year to year that even a ten-year period is not long enough to provide reasonable guidance. We believe a better approach to selecting an investment return assumption is to determine the median expected portfolio return given the fund's targeted allocation and an overall set of capital market assumptions.

Per information received from TSRS, the Fund's current target asset allocation is as follows:

Asset Class	Target Allocation
Domestic Equity	34.0 %
Domestic Fixed Income	27.0 %
International Equity	25.0 %
Real Estate	9.0 %
Infrastructure	5.0 %
Total	100.0%

Because GRS is a benefits consulting firm and does not develop or maintain our own capital market assumptions, we utilized the forward-looking return expectations developed by 11 national consulting firms.

These investment consulting firms periodically issue reports that describe their capital market assumptions. That is, their estimates of expected returns, volatility, and correlations. While these

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assumptions are developed based upon historical analysis, many of these firms also incorporate forward-looking adjustments to better reflect near-term expectations.

Given the plan's current asset allocation and the investment consultants' capital market assumptions, the development of the average expected compound return, net of investment expenses, is provided in the following table.

Expected Annual Geometric Returns and Return Probabilities
(Based on Current Capital Market Assumptions)

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 40th	50th	60th	Probability of exceeding 7.25%	Probability of exceeding 7.00%	Probability of exceeding 6.75%
(1)	(2)	(3)	(4)	(5)	(6)	(6)
1	5.09%	5.65%	6.22%	23.98%	27.53%	31.32%
2	4.91%	5.60%	6.30%	27.65%	30.72%	33.94%
3	5.07%	5.76%	6.46%	29.56%	32.73%	36.04%
4	5.39%	5.98%	6.58%	29.47%	33.22%	37.16%
5	5.18%	5.89%	6.60%	31.44%	34.63%	37.95%
6	5.47%	6.10%	6.74%	32.51%	36.13%	39.88%
7	5.44%	6.11%	6.79%	33.47%	36.93%	40.51%
8	5.39%	6.11%	6.84%	34.58%	37.83%	41.19%
9	5.59%	6.35%	7.11%	38.22%	41.42%	44.68%
10	5.94%	6.63%	7.33%	41.11%	44.66%	48.27%
11	6.59%	7.26%	7.93%	50.14%	53.91%	57.64%
Average	**5.46%**	**6.13%**	**6.81%**	**33.83%**	**37.25%**	**40.78%**

As shown, based on this survey, the average expected median return for the next 10 years is 6.13%.

We do have three sources of longer term expectations (20-30 years), and they are about 0.5% higher.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 40th	50th	60th	Probability of exceeding 7.25%	Probability of exceeding 7.00%	Probability of exceeding 6.75%
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	5.66%	6.31%	6.96%	35.79%	39.45%	43.21%
2	5.76%	6.45%	7.15%	38.68%	42.17%	45.74%
3	6.37%	7.08%	7.79%	47.62%	51.17%	54.73%
Average	**5.93%**	**6.62%**	**7.30%**	**40.70%**	**44.27%**	**47.89%**

On this basis, we recommend that the discount rate be lowered from 7.25% to 6.75%. This reflects the recommended lowering of the inflation assumption from 3.00% to 2.50% and no change to the real return assumption of 4.25%.

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Given that the longer term expectations produce a 44% probability of exceeding 7.00%, GRS could support a 7.00% investment return assumption at this time. However, if the Board elects to use this assumption, we recommend that this assumption be reexamined each year, rather than waiting for the next experience study cycle.

Salary increase rates

In order to project future benefits, the actuary must project future salary increases for individuals. Salaries may increase for a variety of reasons:

- Across-the-board increases for all employees;
- Across-the-board increases for a given group of employees;
- Increases to a minimum salary schedule;
- Additional pay for additional duties;
- Step or service-related increases;
- Increases for acquisition of advanced degrees or specialized training;
- Promotions; or
- Merit increases, if available.

Our salary increase assumption is meant to reflect all of these types of increases.

Most actuaries recommend salary increase assumptions that include an element that depends on the member's age or service, especially for large, public retirement systems. It is typical to assume larger pay increases for younger or shorter-service employees. This is done in order to reflect pay increases that accompany step increases, changes in job responsibility, promotions, demonstrated merit, etc. The experience shows salaries have been more closely correlated to service (rather than age), as promotions and productivity increases tend to be greater in the first few years of a career, even if the new employee is older than the average new hire.

The current salary increase assumption is structured as a select and ultimate assumption with service-based increases for those members with less than five-years of service and age-based increases for members with at least five-years of service. For all age and service-based rates, there is a base inflationary component and a merit and seniority rate schedule. We recommend no change to the rate structure.

The last two experience study periods, 2008 through 2013 and 2013 through 2018, have been a time of extraordinary pay experience for TSRS. During the 2008 through 2013 experience period, there was a strict pay freeze in place during most of the experience period, and individual salaries rose less than 1%. Because this experience was not expected to reflect long-term trends, modest adjustments were made to reduce the salary increase assumptions at that time.

In setting the individual salary increase assumption, the first component that must be addressed is the base inflation component of the increase. Historically, general wage inflation has almost always exceeded price inflation. This is because wage inflation is in theory the result of (a) price inflation, and (b) productivity gains being passed through to wages. Since 1951, for the national economy as a whole, wage inflation has been about 1.00% larger than price inflation each year. For the last 10 years, for the national economy as a whole, wage inflation has been 2.22%, outpacing price inflation by about 0.60%.

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We recommend that a 0.50% productivity component be incorporated into the salary increase assumption. This increase would offset the reduction of the price inflation assumption from 3.00% to 2.50% such that the base inflation component of the salary increase assumption would remain unchanged at 3.00%.

Once a base wage inflation is established, the merit and seniority component can be addressed. However, as with the prior experience study, there were pay anomalies that make it difficult to use the current pay experience in setting the long-term assumption. Unlike the prior experience which reflected a hard freeze, general across the board pay increases were very limited, but other significant promotional increases were observed which, in some instances, resulted in merit and seniority increases in excess of the current assumption. This was observed more so in the pay experience for those with greater than five years of service. It may be that the promotional experience was lagging during the period of hard freeze and the merit and seniority pay increases observed reflect the catchup from that prior period.

The price inflation during the experience period based on CPI-W was 1.37%. We incorporated the additional 0.50% productivity assumption and reflected a base inflation pay increase of 1.87% when determining the amount of merit and seniority increases given. We found that this was consistent with the pay increase data for older members with at least five years of experience.

The following shows the actual pay increases observed for members with less than five years of service. These actual pay increases are in excess of the 1.87% pay inflation assumed for the period. We recommend modest changes to the service-based assumption.

Counts	Service	Actual	Current Assumed Above Inflation	Proposed Assumed Above Inflation
435	0	1.20%	3.50%	3.00%
915	1	2.70%	3.00%	3.00%
727	2	2.61%	2.50%	2.50%
551	3	3.09%	2.00%	2.25%
431	4	2.92%	1.50%	2.00%

The following shows the actual pay increases observed for members with greater than five years of service. These actual pay increases are in excess of the 1.87% pay inflation assumed for the period. As mentioned previously, these increases may reflect catchup from the hard pay freezes in the prior experience study. As such, we are recommending only modest changes to the assumption.

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Counts	Age	Actual	Current Assumed Above Inflation	Proposed Assumed Above Inflation
73	25-29	4.11%	1.50%	2.50%
336	30-34	3.18%	1.50%	2.25%
696	35-39	2.44%	1.30%	1.70%
1,196	40-44	1.47%	0.80%	1.00%
1,599	45-49	0.72%	0.40%	0.50%
1,790	50-54	0.10%	0.25%	0.25%
1,867	55-59	-0.01%	0.25%	0.00%
879	60-64	-0.36%	0.00%	0.00%
262	65 & Over	-0.64%	0.00%	0.00%

The following shows the comprehensive recommended salary increase assumption.

Sample Attained	Percentage Increase in Salary with Less than Five Years of Service		
Service	Merit	Inflation	Total
0	3.00 %	3.00 %	6.00 %
1	3.00	3.00	6.00
2	2.50	3.00	5.50
3	2.25	3.00	5.25
4	2.00	3.00	4.50

Sample Attained	Percentage Increase in Salary with Five or More Years of Service		
Age	Merit	Inflation	Total
25	2.50 %	3.00 %	5.50 %
30	2.25	3.00	5.25
35	1.90	3.00	4.90
40	1.20	3.00	4.20
45	0.60	3.00	3.60
50	0.25	3.00	3.25
55	0.00	3.00	3.00

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Payroll growth rate

The salary increase rates discussed above are assumptions applied to individuals. They are used in projecting future benefits. For purposes of determining certain results as a level percentage of pay, we also use a separate payroll growth assumption, which is currently 3.00% per year. This number is used in determining the contribution needed to amortize the unfunded actuarial accrued liability as a level percentage of pay and in determining the new entrant pay in the funding projections.

Payroll often grows at a rate different from the average pay increases for individual members. Reasons include when older, longer-service members leave employment they are generally replaced with new members who are starting with a lower salary. Because of this, in most populations that are not growing in size, the growth in total payroll will be smaller than the average pay increase for members. On the other hand, payroll can grow due to an increase in the size of the group.

Over the last 27 years (27 being chosen simply because data was readily available for that period), total payroll has grown by only 1.15% per year, while payroll has been assumed to grow at rates of 3.00% or more. This difference is largely due to active member population constriction.

The TSRS Board should give strong consideration to the active member population expectations going forward. If the expectation is that current workforce numbers will hold, a 3.00% payroll growth assumption may continue to be appropriate. However, if there are expectations of continued population constriction, the Board should consider something lower than 3.00%.

Demographic assumptions

As previously mentioned, actuaries are guided by the Actuarial Standards of Practice (ASOP) adopted by the Actuarial Standards Board (ASB). One of these standards is ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. This standard provides guidance to actuaries giving advice on selecting noneconomic assumptions for measuring obligations under defined benefit plans. We believe the recommended assumptions in this report were developed in compliance with this standard.

Except where otherwise noted, we used a liability-weighted approach in the analyses.

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Mortality rates

The longer retirees live and receive their benefits, the larger the liability of the plan, thus increasing the contributions necessary to fund the plan. The valuation currently uses the RP-2000 Combined Mortality Table for males and females projected with Scale BB to 2020 for pre and post-retirement mortality.

It is important to note that although the assumption included some allowance for future longevity improvement at the time it was recommended, it does not reflect any longevity improvement beyond 2020. This approach uses what we refer to as a “static” mortality table. It is called “static” because it is a single table of rates that is used for all participants, regardless of when they were born.

Mortality or longevity improvement has been observed in actual mortality experience for a very long period now, and the expectation is that longevity improvement will continue into the future. Therefore we recommend that TSRS move to a “generational” mortality approach. A generational mortality approach applies a projection improvement scale in all future years with the result that the valuation model assumes that a 65 year-old retiree 10 years from now will live longer than a 65 year-old today, and a 65-year old retiree 20 years from now will live longer still.

Generally, public sector pension actuaries used standard tables published by the Society of Actuaries based on very large aggregated data sets because individual pension systems rarely have sufficient data to develop their own individual tables. In some cases where a system has a large data set, but not sufficient data to develop their own table, they may use a standard table with some adjustments to reflect their own experience.

TSRS had 189 male retiree deaths and 108 female retiree deaths during the experience period. This is a relatively small data set to make adjustments to the standard data set. In addition, GRS observed quite a few more deaths than expected in the female population during this experience period, but observed the opposite effect in the last experience study. As such, we are hesitant to make adjustment to the standard table based on actual experience.

We recommend using the standard RP-2014 mortality tables (specific to healthy employees, healthy retirees, and disabled retirees for the pre-retirement, post-retirement and post-disablement assumptions, respectively) and a fully generational approach using the ultimate rates of the MP-2018 Projection Scales.

Disability rates

TSRS does not cover public safety members and has minimal rates of disability incidence. During the experience period there were 17 disability retirements. The actual to expected ratio based on the five-year experience period was 109%. We recommend no change to the current assumption.

Termination rates

Termination rates reflect members who leave for any reason other than death, disability, or service retirement. They apply whether the termination is voluntary or involuntary, and whether the member takes a refund or keeps his/her account balance on deposit. The current termination rates are service-based during the first five years of service (prior to vesting) and age-based thereafter.

For purposes of studying the service-based termination rate, we used a headcount basis, rather than liability weighted. The liabilities at low service levels were too volatile to produce reliable results.

There were substantially more terminations observed than were expected under the current rates generally at all ages and service levels. However, the observed increase in termination experience was greater at younger ages and lower service levels. Those with greater accrued benefits and those closer to retirement may place higher value on their accrued benefits under the pension plan and continuing to earn accruals on those benefits, and they may be more likely to stay during periods of pay stagnation.

Because the experience study period did include several pay freezes which likely impacted the termination experience, we have placed less credibility on the experience data than we otherwise would have and dampened the movement in the terminations rates.

For the service-based rates prior to vesting, we are recommending modest revisions to the rate schedule that reduce the actual to expected ratio from 125% to 117%.

For the age-based rates after vesting, we are recommending modest revisions to the rate schedule that reduce the actual to expected ratio from 110% to 104%. We did not adjust the shape of the curve to reflect the significantly increased rates at younger ages as we think the younger ages may be more sensitive to pay

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stagnation during the experience period and this trend will not hold over the long term. Instead, we increased rates slightly across all ages.

Retirement rates

We currently use retirement rates that are split into three separate eligibility categories:

- Age Based Early Retirement (reduced benefit)
- Age Based Normal Retirement
- Rule of 80 Retirement

We recommend continued use of this rate structure. At this point, retirement experience is almost entirely Tier 1 members. Rates can be set for Tier 1 based on actual experience and then extrapolated to Tier 2. For this assumption, A/E ratios under 100% are conservative (when there are fewer retirements than expected, the System usually experiences a gain).

Early Retirement

Currently, there is a flat retirement rate of 8.5% applied from age 55 to 59 for Tier 1 and from age 60 to 64 for Tier 2. The Tier 1 early retirement experience during the five-year period produced an A/E ratio of 52% (above half of expected retirements were observed). This large drop in early retirements is likely due to the End of Service Program expiring at the end of 2010. Although the low early retirement rates may continue, there is not sufficient data to apply full credibility. We recommend reflecting partial credibility and reducing this early retirement rate to 6.0% which produces an A/E ratio of 73%.

Age Based Normal Retirement

For Tier 1 who reach age based retirement before reaching Rule of 80, there is a schedule of rates applied between age 62 and age 70 at which a 100% retirement rate is applied. Overall, there were fewer age based retirements than expected and we recommend modest changes to the existing rates to increase the A/E ratio for ages under 70 from 89% to 93%. We recommend continuing to use the Tier 1 rates starting at age 65 for Tier 2 members. Eventually, it may be observed that Tier 2 age based retirement rates are higher because of pent up demand for retirement (they were not eligible for full retirement at ages 62 through 64 as Tier 1 was). However, we prefer to use this slightly conservative approach until we are able to study Tier 2 experience.

Rule of 80 Retirement

For members who reach Rule of 80 prior to age based retirement, we currently assume 27% of these members will retire each year until age 70 at which time a 100% retirement rate is applied. Actual Rule of 80 retirements were slightly fewer than expected and we recommend reducing the rate from 27% to 24% which increases the A/E ratio from 79% to 89%.

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Other assumptions

Forfeiture Rates

Currently the valuation reflects a schedule of forfeiture rates based on age at termination. The forfeiture rate represents the probability that a vested terminated member will take a refund of contributions rather than receive a deferred annuity benefit. We expect this experience to vary based on hire date as member contributions have varied relative to the overall benefit levels. However, we did look at forfeiture experience during the study period, and it indicated that the current assumption is not unreasonable. We recommend no change to this assumption.

	Vested Terminations				
Age	Annuity	Refund	Total	Actual Forfeiture	Assumed Forfeiture
Under 30	3	6	9	67%	50%
30 - 35	20	15	35	43%	45%
35 - 40	28	17	45	38%	40%
40 - 45	41	20	61	33%	35%
45 - 50	23	19	42	45%	30%
50 - 55	34	20	54	37%	25%
55 - 60	35	6	41	15%	20%
60 and Over	11	1	12	8%	0%

Load for Tier 1 Unused Sick and Vacation Leave

Currently the valuation reflects a 1.9% load on benefit and eligibility service for unused sick and vacation leave. In addition, the final average compensation is increased by 2.6% for each resulting fractional year of unused sick and vacation leave determined using the load.

Current member data indicates that unused sick and vacation leave are about 1.83% of accrued service. We recommend leaving the 1.9% service load as is. We recommend leaving the final average compensation unchanged as well at the current level of 2.6%.

Percent married and age difference

Currently, the valuation assumes that 80% of active members are married and that male participants are three years old than their spouses, and female members are three years younger than their spouses. There is insufficient data to study these assumptions; however, these assumptions only get used in valuing active member death benefits and are not material to the valuation. We recommend no change to these assumptions.

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Actuarial methods

Amortization Period

Currently the Board funding policy includes a 20-year level percentage of payroll amortization of the unfunded liability. We recommend no change to this policy; however, GRS could discuss alternative approaches with the Board to achieve strategic objectives.

We recommend no change to any of the other actuarial methods being used.

Administrative procedures

We have reviewed the current processes used to determine default ages, salaries, genders, etc. for missing or inconsistent data and recommend no changes.

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SECTION D

ACTUARIAL IMPACT OF RECOMMENDATIONS

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Estimated Actuarial Impact of Recommendations

For illustrative purposes, the tables shown below show the impact of the proposed assumption changes on the results of the most recent valuations. The first column shows the current valuation results before any recommended changes. The second shows the impact of including all recommended demographic assumption changes. The third shows the impact of including all recommended demographic assumption and discount rate changes. The fourth shows the impact of including all recommended demographic assumption and discount rate changes, as well as a possible reduction of the payroll growth assumption used in the amortization of the unfunded liability.

Impact of Recommended Assumption Changes Effective June 30, 2018

Demographic Assumptions	**Current**	**Recommended**	**Recommended**	**Recommended**
Discount Rate	**7.25%**	**7.25%**	**6.75%**	**6.75%**
Payroll Growth	**3.00%**	**3.00%**	**3.00%**	**2.50%**
1. Actuarial Accrued Liability	$ 1,053,987,024	$1,084,669,450	$1,139,082,981	$1,139,082,981
2. Actuarial Value of Assets	803,439,269	803,439,269	803,439,269	803,439,269
3. Unfunded Accrued Liability	$ 250,547,755	$ 281,230,181	$ 335,643,712	$ 335,643,712
4. Funded Ratio	76.2%	74.1%	70.5%	70.5%
5. Normal Cost Rate	10.97%	11.30%	12.66%	12.66%
6. Amortization of Unfunded	15.46%	17.35%	19.88%	20.75%
7. Administrative Expenses	0.63%	0.63%	0.63%	0.63%
8. Total Actuarially Determined Contribution	27.06%	29.28%	33.17%	34.04%
9. Blended Member Contribution	5.07%	5.18%	5.49%	5.49%
10. Net Employer Contribution	21.99%	24.10%	27.69%	28.55%
11. One-half Normal Cost (member pre-roundup)				
a. Tier 1 Variable	6.42%	6.60%	7.37%	7.37%
b. Tier 2	4.78%	5.04%	5.62%	5.62%

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SECTION E

SUMMARY OF ASSUMPTIONS AND METHODS INCORPORATING THE RECOMMENDED ASSUMPTIONS

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Summary of Actuarial Methods and Assumptions

I. Valuation Date

The valuation date is July 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (6.75%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

2. The employer contributions required to support the benefits of the Plan are determined following a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

3. The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his anticipated covered service, would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf. Effective July 1, 2013 the TSRS funding policy requires the computation of normal cost separately for those members in Tier 1 and Tier 2 (the variable rate tiers).

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 20 years from the valuation date as a level percentage of pay. It is assumed that payments are made throughout the year.

5. Administrative expenses for the recent year will be added to the employer normal cost in the current valuation and will be reflected in the recommended employer rate for the upcoming fiscal year.

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III. Actuarial Value of Assets

The actuarial value of assets is based on recognizing gains and losses over a five-year period where gains and losses are determined by comparing the projected market value return (based on the prior year's market value of assets, cash flows during the year and expected investment returns on those amounts) to the actual market investment return.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 6.75% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 4.25% real rate of return. This rate represents the assumed return, net of all investment expenses.

2. Salary increase rate:

Sample Attained Service	Percentage Increase in Salary with Less than Five Years of Service		
	Merit	Inflation	Total
0	3.00 %	3.00 %	6.00 %
1	3.00	3.00	6.00
2	2.50	3.00	5.50
3	2.25	3.00	5.25
4	2.00	3.00	4.50

Sample Attained Age	Percentage Increase in Salary with Five or More Years of Service		
	Merit	Inflation	Total
25	2.50 %	3.00 %	5.50 %
30	2.25	3.00	5.25
35	1.90	3.00	4.90
40	1.20	3.00	4.20
45	0.60	3.00	3.60
50	0.25	3.00	3.25
55	0.00	3.00	3.00

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.00% per year (or less). This increase rate is primarily due to the effect of inflation on salaries, with no allowance for future membership growth.

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B. Demographic Assumptions

1. Mortality rates – Healthy Pre-Retirement Mortality RP-2014 Employee Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Healthy Post-Retirement Mortality RP-2014 Healthy Annnuitant Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Disabled Mortality RP-2014 Disabled Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Mortality rates were adjusted to include margin for future mortality improvement as described in the table name above. Sample rates shown below:

Sample Attained Ages	Probability of Death Pre-Retirement		Probability of Death Post-Retirement		Probability of Death Post-Disability	
	Men	Women	Men	Women	Men	Women
20	0.04 %	0.02 %	0.04 %	0.02 %	0.05 %	0.02 %
25	0.01	0.00	0.01	0.01	0.02	0.02
30	0.05	0.02	0.08	0.06	0.49	0.23
35	0.05	0.03	0.12	0.10	0.86	0.42
40	0.06	0.04	0.18	0.15	1.27	0.66
45	0.10	0.07	0.27	0.21	1.68	0.92
50	0.17	0.11	0.41	0.28	2.04	1.19
55	0.28	0.17	0.57	0.36	2.34	1.45
60	0.47	0.24	0.78	0.52	2.66	1.70
65	0.83	0.37	1.10	0.80	3.17	2.09
70	1.39	0.63	1.68	1.29	4.03	2.82
75	2.32	1.08	2.68	2.09	5.43	4.10
80	3.88	1.84	4.47	3.48	7.66	6.10
85	7.56	4.73	7.75	6.05	11.33	9.04

2. Disability rates. Sample rates shown below:

Sample Attained Ages	Probability of Disablement Next Year	
	Men	Women
25	0.01 %	0.01 %
30	0.07	0.07
35	0.09	0.09
40	0.14	0.14
45	0.17	0.17
50	0.25	0.25
55	0.36	0.36
60	0.48	0.48

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3. Termination rates (for causes other than death, disability or retirement): Termination rates are based on service and age. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates are shown:

Sample Attained Age	Years of Credible Service	Probability of Termination
Any	0	19.00 %
	1	14.00
	2	11.00
	3	9.00
	4	9.00
20	5 & over	7.40
25		7.40
30		6.98
35		4.88
40		3.83
45		3.10
50		2.68
55		2.57

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4. Forfeiture rates: The percentages below represent the probability that a vested terminated member will take a refund of contributions rather than receive a deferred annuity benefit.

Sample Ages	% of Vested Terminating Members Choosing Refund at Termination
Under 30	50 %
30	45
35	40
40	35
45	30
50	25
55	20
60 and Over	0

5. Retirement rates for Tier 1. For those ages 62+, the Rule of 80 retirement rates only applies if the Rule of 80 is attained by age 62.

- Attained Age	Tier 1 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
50-54	24.0 %		
55-59	24.0		6.0
60	24.0		
61	24.0		
62	24.0	33.0	
63	24.0	18.0	
64	24.0	18.0	
65	24.0	18.0	
66	24.0	40.0	
67-69	24.0	30.0	
70 & Over	100.0	100.0	

Retirement rates for Tier 2. For those ages 65+, the Rule of 85 retirement rates only applies if the Rule of 85 is attained by age 65.

- Attained Age	Tier 2 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
60	24.0		6.0
61	24.0		6.0
62	24.0		6.0
63	24.0		6.0
64	24.0		6.0
65	24.0	18.0	
66	24.0	40.0	
67-69	24.0	30.0	
70 & Over	100.0	100.0	

Deferred vested members are assumed to retire at age first eligibility for unreduced benefits.

C. <u>Other Assumptions</u>

1. Percent married: 80% of employees are assumed to be married.

2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.

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3. Cost of living adjustment: None.
4. Optional forms: Members are assumed to elect the normal form of benefit.
5. Current and future deferred vested participants are assumed to retire at the earlier of age 62 and eligibility for rule of 80 for tier 1 and the earlier of age 65 and eligibility for the rules of 85 (but at least 60) for Tier 2.
6. Administrative expenses: Administrative expenses are added to the employer normal cost , before application of the round up policy.
7. Pay increase timing: End of year.
8. Decrement timing: Decrements of all types are assumed to occur mid-year.
9. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
10. Decrement relativity: Decrement rates are used directly, without adjustment for multiple decrement table effects.
11. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
12. Benefit and Eligibility Service due to Accrued Sick and Vacation Leave at Retirement and Termination: Tier 1 Members are assumed to have an additional 0.019 years per year of benefit and eligibility service at early or normal retirement and termination due to accrued sick and vacation leave. This assumption was developed using sick and vacation leave and service amounts for active members included in the actuarial valuation as of June 30, 2013.

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SECTION F

SUMMARY OF DATA AND EXPERIENCE

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Service-Based Termination Experience

Service Index	Withdrawal	Exposure	Crude Rates	Sample Rates		Expected Withdrawals		Actual to Expected	
				Old	New	Old	New	Old	New
1	129	566	0.2279	0.1800	0.1900	104	108	124%	119%
2	183	1,098	0.1667	0.1300	0.1400	146	154	125%	119%
3	114	841	0.1356	0.1000	0.1100	87	93	131%	123%
4	52	603	0.0862	0.0800	0.0900	50	54	104%	96%
5	51	476	0.1071	0.0750	0.0900	37	43	138%	119%
Totals	529	3,584	0.1476	0.1183	0.1261	424	452	125%	117%

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Age-Based Termination Experience
(for those with greater than 5 years of service)

Age	Withdrawal	Exposure	Crude Rates	Sample Rates		Expected Withdrawals		Actual to Expected	
				Old	New	Old	New	Old	New
Under 30	3	19	0.1423	0.0711	0.0746	1	1	200%	195%
30-34	13	137	0.0936	0.0562	0.0590	8	8	167%	159%
35-39	33	484	0.0680	0.0407	0.0428	20	21	167%	159%
40-44	41	1,189	0.0349	0.0331	0.0347	39	41	106%	100%
45-49	66	2,442	0.0272	0.0270	0.0284	66	69	101%	96%
50-54	59	3,069	0.0192	0.0248	0.0261	76	80	77%	74%
55-59	48	1,325	0.0362	0.0249	0.0261	33	35	145%	139%
60-64	14	382	0.0365	0.0252	0.0264	10	10	145%	138%
Totals	277	9,046	0.0306	0.0279	0.0293	253	266	110%	104%

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Early Retirement Experience

Age	Retirements	Exposure	Crude Rates	Sample Rates Old	Sample Rates New	Expected Retirements Old	Expected Retirements New	A/E Ratio Old	A/E Ratio New
55	13	199	0.0663	0.0850	0.0600	16.9	11.9	78%	111%
56	4	169	0.0233	0.0850	0.0600	14.4	10.1	27%	39%
57	-	131	0.0000	0.0850	0.0600	11.2	7.9	0%	0%
58	7	76	0.0948	0.0850	0.0600	6.5	4.6	112%	158%
59	2	30	0.0759	0.0850	0.0600	2.6	1.8	89%	127%
Totals	27	605	0.0440			51.4	36.3	52%	73%

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Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Sample Rates		Expected Retirements		Actual to Expected	
				Old	New	Old	New	Old	New
62	54	173	0.3132	0.3300	0.3300	57	57	95%	95%
63	22	125	0.1721	0.1600	0.1800	20	22	108%	98%
64	17	105	0.1599	0.2000	0.1800	21	19	80%	88%
65	21	115	0.1791	0.2400	0.1800	28	21	74%	98%
66	35	88	0.3990	0.3500	0.4000	31	35	114%	101%
67	14	44	0.3138	0.3500	0.3000	15	13	92%	106%
68	2	35	0.0676	0.3500	0.3000	12	10	20%	24%
69	11	41	0.2673	0.3500	0.3000	14	12	78%	91%
Totals	175	726	0.2416			198	189	**89%**	**93%**
70 & Over	26	119	0.2200	1.0000	1.0000	119	119	22%	22%
Total	202	845	0.2385			317	308	64%	65%

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Rule of 80 Retirement

Age	Retirements	Exposure	Crude Rates	Sample Rates Old	Sample Rates New	Expected Retirements* Old	Expected Retirements* New
Under 45	-	-	N\A	N\A	N\A	-	-
45	-	-	N\A	N\A	N\A	-	-
46	-	-	N\A	N\A	N\A	-	-
47	-	-	N\A	N\A	N\A	-	-
48	15	15	1.0000	N\A	N\A	4	-
49	-	5	0.0000	N\A	N\A	1	-
50	25	20	1.2322	0.2700	0.2400	5	5
51	16	65	0.2496	0.2700	0.2400	17	16
52	59	174	0.3397	0.2700	0.2400	47	42
53	67	234	0.2848	0.2700	0.2400	63	56
54	85	310	0.2738	0.2700	0.2400	84	74
55	84	409	0.2057	0.2700	0.2400	110	98
56	86	467	0.1846	0.2700	0.2400	126	112
57	97	497	0.1948	0.2700	0.2400	134	119
58	118	525	0.2248	0.2700	0.2400	142	126
59	88	503	0.1756	0.2700	0.2400	136	121
60	76	493	0.1541	0.2700	0.2400	133	118
61	86	457	0.1887	0.2700	0.2400	123	110
62	91	388	0.2342	0.2700	0.2400	105	93
63	52	260	0.1991	0.2700	0.2400	70	62
64	39	226	0.1707	0.2700	0.2400	61	54
65	21	192	0.1109	0.2700	0.2400	52	46
66	39	160	0.2426	0.2700	0.2400	43	38
67	30	100	0.3013	0.2700	0.2400	27	24
68	13	54	0.2464	0.2700	0.2400	15	13
69	-	28	0.0000	0.2700	0.2400	8	7
Totals	1,187	5,582	0.2127			1,506	1,335
Actual/Expected						79%	89%

DRAFT

Experience Study for the Period Ending June 30, 2018

Leslie Thompson, FSA, EA, MAAA

January 24, 2019

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Agenda

- Ultimate recommendations were consistent with preliminary recommendations
- Refresher from last time
  - Additional detail on experience
  - Full valuation results with all recommendations

GRS Retirement Consulting

Purpose of Valuation

- The ***<u>primary</u>*** purpose of the annual actuarial valuation is to either (1) set or (2) assess the adequacy of the contribution policy
  - "Funding" or "contribution allocation procedure"
- Time to full funding
- Ensure 27.5% meets actuarial requirements
- Employee normal costs/set employee contributions

GRS Retirement Consulting

How assumptions factor in …

- Over time, the true cost of benefits will be borne out in actual experience
  - Cost of benefits NOT affected by actuarial assumptions
  - Determined by actual participant behavior (termination, retirement), plan provisions, and actual investment returns
- Assumptions help us anticipate and manage what each component of the equation will be
  - Assumptions dictate the timing of the contributions
  - Develop expectations for future contributions, investment returns and benefit payments
  - Important for decision making

GRS Retirement Consulting

Purpose of Experience Study

- Assumptions are not static; they should occasionally change to reflect
  - New information
  - Mortality improvement
  - Changing patterns of retirements, terminations, etc.
  - Changing knowledge
- Recent experience provides strong guidance for some assumptions (for example, termination) and weak guidance for others (for example, the investment return rate)
- Based on results of study:
  - Actuary recommends revised assumptions
  - Board accepts, modifies, or rejects recommendations

GRS Retirement Consulting

Purpose of Experience Study

- The report answers these questions for each assumption
  – What was the plan's actual experience?
  – How does that compare with current assumptions?
  – Is the experience consistent with future expectations?
  – Is a change warranted?
- We also measure the impact of the recommended changes on the contributions and actuarial liabilities

Assumptions for review

- Demographic
  - Mortality (pre/post retirement, healthy/disabled)
  - Disability
  - Termination
  - Retirement
  - Other
- Economic
  - Inflation
  - Real Rate of Return
  - Individual Salary Increases
  - Total Payroll Growth

GRS Retirement Consulting

Inflation Assumption

- Building block for other assumptions:
  - Salary increases
  - Payroll growth
  - Investment return
- Currently 3.0%

GRS Retirement Consulting

Inflation Assumption

- Metrics for consideration
  - Social Security Administration Forecast: 2.6%
  - 11 investment consultants (7-10 year): 2.20%
  - 3 investment consultants (20-30 year): 2.42%
  - Philadelphia Federal Reserve: 2.30%

- Recommendation: Reduce from 3.00% to 2.50%

GRS Retirement Consulting

Capital Market Assumptions – Investment Consultants

- We performed the analysis using the current target asset allocation
- Projected real returns were developed using TSRS' target investment allocation and 2018 capital market return assumptions developed by fifteen investment consulting firms and a broader survey:
  - 11 have 7-10 year time horizons
  - 3 have 20+ year time horizons

GRS Retirement Consulting

Distribution of Expected Returns

7-10 Year Time Horizon

- Target Portfolio
- 2.50% Inflation Assumption
- Average Median Expected Real Return of 3.63%

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 40th	50th	60th	Probability of exceeding 7.25%
(1)	(2)	(3)	(4)	(5)
1	5.09%	5.65%	6.22%	23.98%
2	4.91%	5.60%	6.30%	27.65%
3	5.07%	5.76%	6.46%	29.56%
4	5.39%	5.98%	6.58%	29.47%
5	5.18%	5.89%	6.60%	31.44%
6	5.47%	6.10%	6.74%	32.51%
7	5.44%	6.11%	6.79%	33.47%
8	5.39%	6.11%	6.84%	34.58%
9	5.59%	6.35%	7.11%	38.22%
10	5.94%	6.63%	7.33%	41.11%
11	6.59%	7.26%	7.93%	50.14%
Average	**5.46%**	**6.13%**	**6.81%**	**33.83%**

GRS Retirement Consulting

Distribution of Expected Returns

20-30 Year Time Horizon

- Target Portfolio
- 2.5% Inflation
- 20-30 year time horizons
- Average Expected Real Return of 4.12%

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 40th	50th	60th	Probability of exceeding 7.25%
(1)	(2)	(3)	(4)	(5)
1	5.66%	6.31%	6.96%	35.79%
2	5.76%	6.45%	7.15%	38.68%
3	6.37%	7.08%	7.79%	47.62%
Average	**5.93%**	**6.62%**	**7.30%**	**40.70%**

GRS Retirement Consulting

Investment Return Recommendation

- Current assumption is 7.25% (4.25% real return)
- The likelihood of achieving that return over a longer horizon is between 35% and 40%
- Lowering the rate increases the likelihood of actually achieving the assumed return
- Lowering the rate to 6.75% improves probability of achieving the rate
  - The likelihood of achieving this rate over a 20 year period is between 40% and 48%
  - Takes some investment risk off the table

Individual Salary Increase Assumption

- Pay freezes in the recent past
  - 2008 to 2013 period reflected several years of hard pay freezes
  - 2013 to 2018 had limited across the board inflationary increases, but seemed to reflect significant promotional increases
- Recommend continued use of base of 3.0%
  - With reduced inflation of 2.5%, implies 2.5% inflation plus 0.5% general wage inflation
  - Give partial credibility to pay experience during the period to set merit/promotion increases

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Individual Salary Increase Assumption Service-Based

Counts	Service	Actual	Current Assumed Above Inflation	Proposed Assumed Above Inflation
435	0	1.20%	3.50%	3.00%
915	1	2.70%	3.00%	3.00%
727	2	2.61%	2.50%	2.50%
551	3	3.09%	2.00%	2.25%
431	4	2.92%	1.50%	2.00%

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Individual Salary Increase Assumption Age-Based

Counts	Age	Actual	Current Assumed Above Inflation	Proposed Assumed Above Inflation
73	25-29	4.11%	1.50%	2.50%
336	30-34	3.18%	1.50%	2.25%
696	35-39	2.44%	1.30%	1.70%
1,196	40-44	1.47%	0.80%	1.00%
1,599	45-49	0.72%	0.40%	0.50%
1,790	50-54	0.10%	0.25%	0.25%
1,867	55-59	-0.01%	0.25%	0.00%
879	60-64	-0.36%	0.00%	0.00%
262	65 & Over	-0.64%	0.00%	0.00%

GRS Retirement Consulting

Individual Salary Increase Assumption Recommendation

Sample Attained Service	Percentage Increase in Salary with Less than Five Years of Service		
	Merit	Inflation	Total
0	3.00 %	3.00 %	6.00 %
1	3.00	3.00	6.00
2	2.50	3.00	5.50
3	2.25	3.00	5.25
4	2.00	3.00	4.50

Sample Attained Age	Percentage Increase in Salary with Five or More Years of Service		
	Merit	Inflation	Total
25	2.50 %	3.00 %	5.50 %
30	2.25	3.00	5.25
35	1.90	3.00	4.90
40	1.20	3.00	4.20
45	0.60	3.00	3.60
50	0.25	3.00	3.25
55	0.00	3.00	3.00

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Payroll Growth Assumption

- Affects amortization of unfunded liability and funding projections
  - Higher assumption defers payments on the unfunded liability
- Given individual pay increase assumption and assuming static active population (if member terminates, they are replaced with new hire), could support current 3.0%
- However, given continued budgetary pressures at the city and long-term trend of active population constriction, may want to consider something lower
  - Last 27 years = 1.15%
- May want to consult with finance department on staffing expectations

GRS Retirement Consulting

Mortality Assumptions

- TSRS does not have enough mortality experience to have custom mortality assumption
- Recommend use of standard RP-2014 mortality tables
- PUB-10 published recently, but not considered finalized
  – Not necessarily a better fit for TSRS anyway
- Most importantly, move to generational mortality
  – Use of ultimate rates of the MP projection scale

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Other Demographic Assumptions

- Sufficient TSRS experience to make adjustments based on actual experience
  - At age 62, there were 100 eligible to retire
  - Assume 33% will retire
  - How many actually did?

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Other Demographic Assumptions

- Retirement
  - Modest changes to normal retirement rates
  - Reduce “rule of” retirement rates
  - Reduce early retirement rates
    - Prior experience likely reflected End of Service Program which is no longer available

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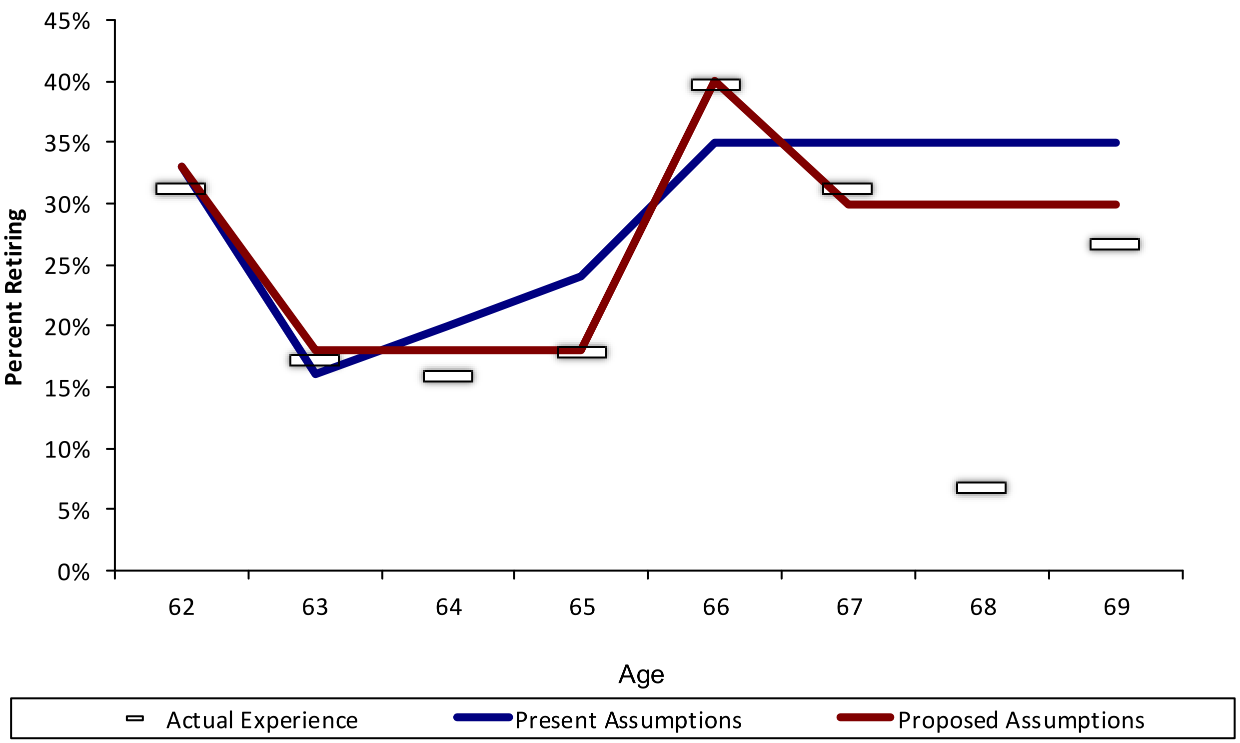
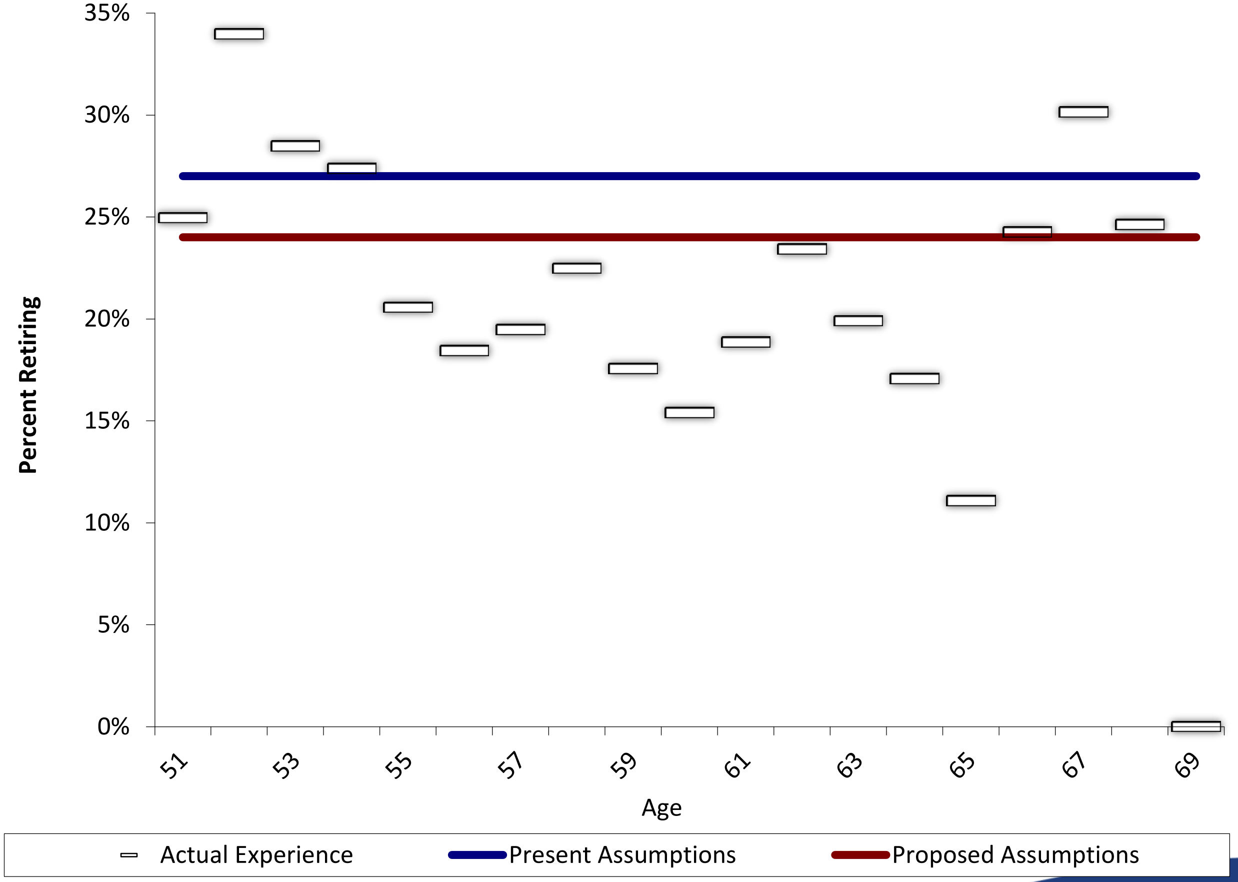
Other Demographic Assumptions

- Normal Retirement (not Rule of)



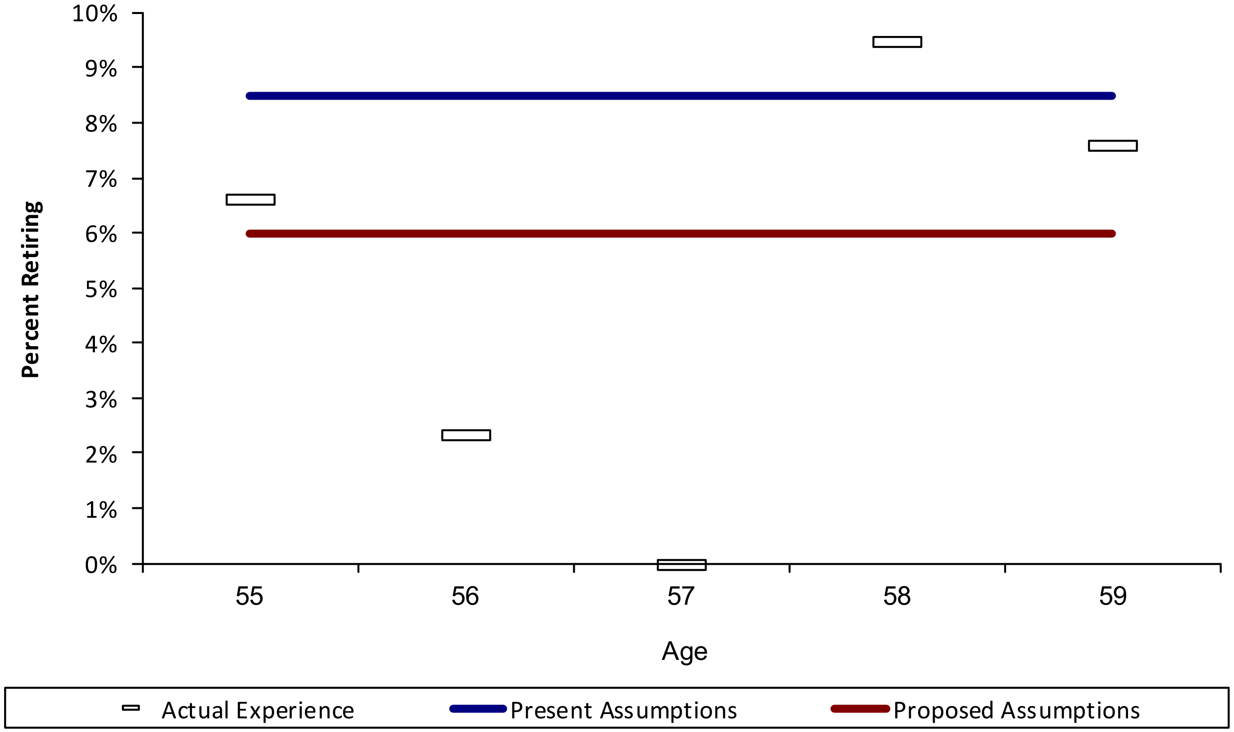
Other Demographic Assumptions

- Rule of Retirement



Other Demographic Assumptions

- Early Retirement

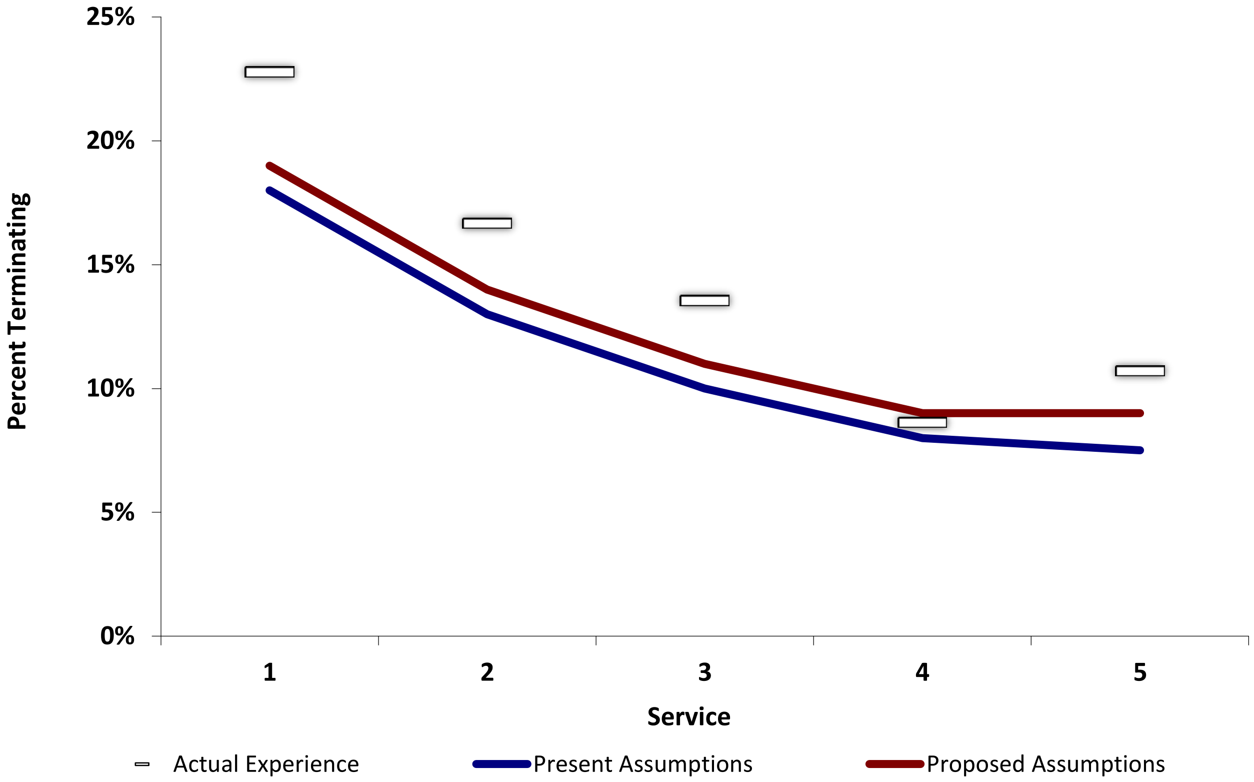


Other Demographic Assumptions

- Termination
  - Increases in observed vested terminations
    - Significant increases at younger ages
  - Likely reflects pay experience in last 5 years
  - Bigger observed differences at younger ages may reflect impact of pension benefit on behavior
    - Closer to retirement members may be better retained by accrued benefit in times of pay stagnation
  - GRS recommends only giving minimal credibility to increased service-based (5+ years) termination rates due to the pay circumstances

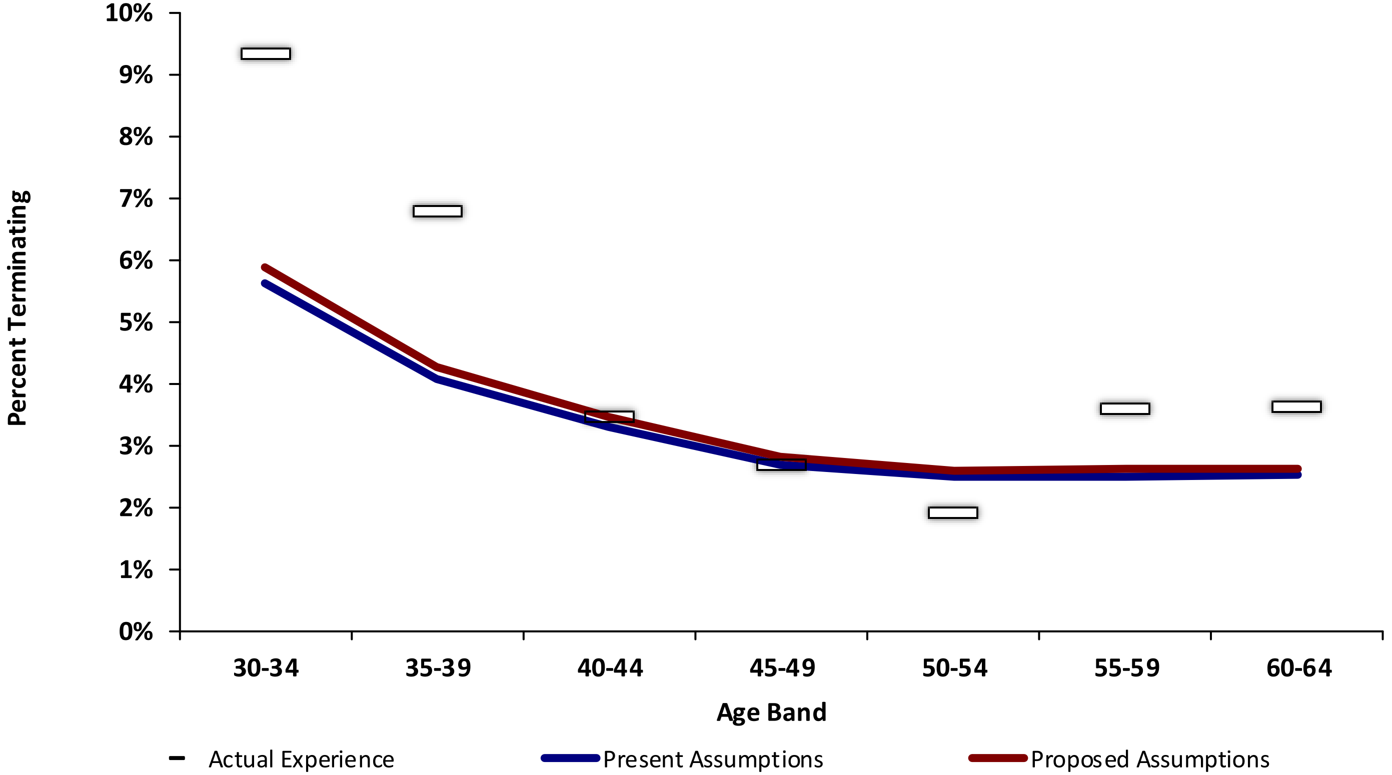
Other Demographic Assumptions

- Service-Based Termination



Other Demographic Assumptions

- Age-Based Termination



Other Demographic Assumptions

- Other minor assumptions were assessed, but no changes were recommended

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Impact on valuation results

Impact of Recommended Assumption Changes Effective June 30, 2018				
Demographic Assumptions	**Current**	**Recommended**	**Recommended**	**Recommended**
Discount Rate	**7.25%**	**7.25%**	**6.75%**	**6.75%**
Payroll Growth	**3.00%**	**3.00%**	**3.00%**	**2.50%**
1. Actuarial Accrued Liability	$ 1,053,987,024	$1,084,669,450	$1,139,082,981	$1,139,082,981
2. Actuarial Value of Assets	803,439,269	803,439,269	803,439,269	803,439,269
3. Unfunded Accrued Liability	$ 250,547,755	$ 281,230,181	$ 335,643,712	$ 335,643,712
4. Funded Ratio	76.2%	74.1%	70.5%	70.5%
5. Normal Cost Rate	10.97%	11.30%	12.66%	12.66%
6. Amortization of Unfunded	15.46%	17.35%	19.88%	20.75%
7. Administrative Expenses	0.63%	0.63%	0.63%	0.63%
8. Total Actuarially Determined Contribution	27.06%	29.28%	33.17%	34.04%
9. Blended Member Contribution	5.07%	5.18%	5.49%	5.49%
10. Net Employer Contribution	21.99%	24.10%	27.69%	28.55%
11. One-half Normal Cost (member pre-roundup)				
a. Tier 1 Variable	6.42%	6.60%	7.37%	7.37%
b. Tier 2	4.78%	5.04%	5.62%	5.62%

Impact on Valuation Results – Alternative Studies Requested

Impact of Recommended Assumption Changes Effective June 30, 2018

Demographic Assumptions	**Current**	**Recommended**	**Recommended**	**Recommended**	**Recommended**	**Recommended**	**Recommended**	**Recommended**
Discount Rate	**7.25%**	**7.25%**	**6.75%**	**6.75%**	**7.00%**	**7.00%**	**6.75%**	**7.00%**
Base Salary Increase	**3.00%**	**3.00%**	**3.00%**	**3.00%**	**3.00%**	**2.75%**	**2.75%**	**2.50%**
Payroll Growth	**3.00%**	**3.00%**	**3.00%**	**2.50%**	**3.00%**	**2.75%**	**2.75%**	**2.50%**
1. Actuarial Accrued Liability	$ 1,053,987,024	$1,084,669,450	$1,139,082,981	$1,139,082,981	$1,111,311,225	$1,109,366,223	$1,137,077,192	$1,107,428,182
2. Actuarial Value of Assets	803,439,269	803,439,269	803,439,269	803,439,269	803,439,269	803,439,269	803,439,269	803,439,269
3. Unfunded Accrued Liability	$ 250,547,755	$ 281,230,181	$ 335,643,712	$ 335,643,712	$ 307,871,956	$ 305,926,954	$ 333,637,923	$ 303,988,913
4. Funded Ratio	76.2%	74.1%	70.5%	70.5%	72.3%	72.4%	70.7%	72.6%
5. Normal Cost Rate	10.97%	11.30%	12.66%	12.66%	11.96%	11.62%	12.31%	11.30%
6. Amortization of Unfunded	15.46%	17.35%	19.88%	20.75%	18.62%	18.89%	20.19%	19.17%
7. Administrative Expenses	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%
8. Total Actuarially Determined Contribution	27.06%	29.28%	33.17%	34.04%	31.20%	31.15%	33.13%	31.10%
9. Blended Member Contribution	5.07%	5.18%	5.49%	5.49%	5.33%	5.26%	5.41%	5.19%
10. Net Employer Contribution	21.99%	24.10%	27.69%	28.55%	25.87%	25.89%	27.71%	25.91%
11. One-half Normal Cost (member pre-roundup)								
a. Tier 1 Variable	6.42%	6.60%	7.37%	7.37%	6.97%	6.79%	7.18%	6.61%
b. Tier 2	4.78%	5.04%	5.62%	5.62%	5.32%	5.19%	5.49%	5.06%

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Next Steps

- Board will need to adopt an assumption set for first use in June 30, 2019 actuarial valuation
- If actuarial equivalence factors should be updated to reflect new funding assumptions, Board/Staff/GRS work to determine effective date and implement in benefits software

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RULES AND POLICIES OF THE TUCSON SUPPLEMENTAL RETIREMENT SYSTEM BOARD OF TRUSTEES

[NOTE: Highlights show changes made after the Board's discussion at December 2018 meeting.]

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RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES

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1.0 LEGAL REQUIREMENTS

1.1 These Board Rules and Policies are adopted pursuant to Article III of Chapter 22 of the Tucson Code ("TCC").

1.2 The System is operated in accordance with the Internal Revenue Code provisions applicable to tax-qualified governmental retirement plans, the Arizona Constitution, applicable provisions of the Arizona Revised Statutes and the TCC.

1.3 The Board shall make an annual report to the Mayor and Council to report on the status of the System and the Board's activities, and to make recommendations regarding the System to the Mayor and Council. The annual report shall be prepared and presented in accordance with any requests from the Mayor and Council, as well as the City's guidelines for Boards, Committees and Commissions.

2.0 ORGANIZATION

2.1 Pursuant to TCC Sec. 22-44(a), the Board shall consist of seven members, as follows:

(a) A Chairman, to be appointed by the Mayor, subject to the approval of the Council;

(b) The Director of Human Resources or their designee;

(c) The Director of Finance or their designee;

(d) Two contributing members, known as employee-representative trustees, nominated and elected by the contributing members of the System in accordance with Board Rule 5.0;

(e) One retired member nominated and elected by the retired members of the System in accordance with Board Rule 6.0;

(f) One member appointed by the City Manager.

3.0 QUALIFICATIONS, COMPENSATION AND TERM LIMITS

3.1 The Chairman and the Board member appointed by the City Manager shall be appointed based on the individual's business experience with emphasis on a discipline such as law, retirement administration, accounting or investments.

3.2 The members of the Board shall serve without compensation but shall be reimbursed for expenses incurred by them in the performance of their duties.

3.3 The Directors of Human Resources and Finance are standing Board members and are not subject to limitations on their terms as Board members. The Chairman shall serve a term of four years. All other Board members shall serve a term of three years. Any employee-representative trustee or retiree representative trustee who has been elected to two consecutive terms shall not be eligible to succeed themselves.

[Does the Board want to specify term ending dates for the Mayor and City Manager appointees or any procedures for those appointments?]

4.0 EMPLOYEE REPRESENTATIVE TRUSTEES

4.1 Inasmuch as TCC Sec. 22-44(b)(4), as amended, reads in part as follows:

> "Two contributing members, known as employee representative trustees, nominated and elected by the contributing members of the System in the manner as the Board shall prescribe by regulation,"

the Board adopts the following rules:

4.2 Nominations

(a) Not later than the regular November meeting, the Chairman of the Board of Trustees shall appoint a nominating committee consisting of three members:

(a)(1) The incumbent employee representative trustee who is not scheduled for re-election in the forthcoming election shall chair the committee; and

(a)(2) Two non-trustee contributing members of the System who have not served in any capacity on the nominating committee for the past five years.

(b) The Nominating Committee shall, not later than the following December meeting of the Board of Trustees, choose and forward to the Board for its consideration, an appropriate number of nominees for the position of employee representative; no fewer than two names shall be forwarded who shall be contributing members of the System. The nominating committee shall determine that the members nominated are agreeable to the placing of their names in nomination and will accept office if elected and perform to the best of his or her ability the duties required of the position.

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4.3 Restrictions

(a) Although the employee representative trustee may be nominated from departments already represented, the two employee representative trustees may not be from the same department.

(b) Should, as a result of a city reorganization, the employee representative trustees represent the same department, the employee representative trustees shall be allowed to serve to the completion of their respective terms. The employee representative trustee's term which expires first will not be eligible to have his or her name replaced in nomination.

4.4 Elections

(a) A ballot form, approved by the Board, listing the names of the nominees (along with biographical information submitted by the nominated candidates) and balloting instructions shall be prepared by the System Administrator and distributed to each contributing member of the System not later than January 31. An envelope shall be enclosed with each ballot for return to the System Administrator. Ballots are to be returned no later than 15 calendar days after distribution. Ballots received after that date will not be counted.

(b) As expeditiously as possible after the close of the election, the nominating committee, acting as the tellers committee, shall open and tabulate all valid ballots received and certify the results of the election to the Board of Trustees. The nominee receiving the highest number of valid votes shall be declared the winner and seated as an employee representative trustee at the next regular meeting of the Board of Trustees.

(c) In the event of a tie vote for the highest number of votes, such tie shall be resolved by the two nominees by the drawing of lots.

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(d) All ballots returned to the Board shall be retained for thirty (30) days after the new Board member is sworn in. Any ballots returned to the Board due to insufficient address shall be deemed invalid. Upon expiration of the thirty (30) day period, all ballots shall be destroyed by the System Administrator.

(e) Should a vacancy occur in the employee representative trustee positions, the Board of Trustees shall appoint a qualified contributing member of the System to complete the unexpired term of the trustee.

(f) In the event only one candidate applies for nomination and the Nominating Committee finds that the candidate is qualified, the Board may appoint that person to the Board without an election being held. In the event no candidates apply for nomination, the position is considered vacant and the Board may appoint a member pursuant to Section 4.4(e).

5.0 ELECTION OF RETIRED MEMBER

As set forth in T.C.C. Section 22-44(b)(5), the Retiree Representative on the Tucson Supplemental Retirement System (TSRS) Board of Trustees shall be **<u>elected by retired members of the System</u> and shall be a voting member of the Board.** The term of office shall be for three (3) years. A Retiree Representative who has been elected for two consecutive terms shall not be eligible to succeed themselves.

Any City of Tucson retiree who is a member of the Tucson Supplemental Retirement System is eligible to compete in the nominating/election process for the Retiree Representative position.

5.1 The process for nominating and electing a Retiree Representative to the Tucson Supplemental Retirement System Board of Trustees shall be administered by the Executive Board of the City of Tucson Retirees Association (CTRA) in accordance with this TSRS Board Rule and Regulation.

5.2 The Chairman of the CTRA Executive Board shall appoint a Nominating Committee of not fewer than three (3) retired members of TSRS no later than the CTRA Board's October meeting. Any retiree seeking nomination to the TSRS Board shall not serve on the Nominating Committee.

5.3 It shall be the duty of the Nominating Committee to nominate at least one, but not more than three (3), nominees for the position of TSRS Board Retiree Representative. The TSRS Administrator, on behalf of the Nominating Committee, shall mail a nomination application directly to all TSRS retired members. The deadline for TSRS retirees to submit nominations to the Nominating Committee shall be November 10th. The Nominating Committee shall file recommended nominations with the CTRA Chairman by November 14th. Before filing nominations, the Nominating Committee shall determine that the members nominated agree to have their names on the election ballot and will accept office if elected. A certificate of "agreement to serve" signed by each person nominated shall accompany the Nominating Committee's written recommendations.

The Nominating Committee's report will be presented to the CTRA Executive Board for official action no later than November 15th.

5.4 Election for the position of Retiree Representative on the TSRS Board of Trustees shall be conducted by mail ballot. An Election Committee of not fewer than three (3) TSRS retirees shall be appointed by the Chairman of the CTRA Executive Board no later than the November board meeting. A nominee seeking election to the Retiree Representative position **shall not** serve on the Election Committee.

The Election Committee shall see that a TSRS Board Retiree Representative ballot, clearly identified as such, is printed with candidate names in alphabetical order. “Incumbent” will be added to the candidate currently serving when running for a second term. A brief statement of qualifications and biographical data for each candidate shall be provided with the ballot.

As soon as possible, the Election Committee shall provide the ballot and candidate information to the TSRS Administrator for mailing to TSRS retirees. The TSRS Administrator will prepare and send a direct mailing to all TSRS retirees containing the ballot, candidate statement materials and any other election information being included in the CTRA Newsletter. The Election Committee shall prepare a summary regarding the election, including nominee names, candidate information and ballot instructions and deadlines, to be published in the November CTRA Newsletter.

No voter identification will be required on the ballot form. However, identification shall be required to verify that the person voting is an eligible TSRS retiree and to verify that no eligible voter has voted more than one time. The TSRS Administrator will prepare and include in the direct mailing a return envelope for the ballot which includes the name of the voting member in the upper left corner of the envelope. **Completed ballots must be returned to the Election Committee in an envelope stating the TSRS retiree’s name in the upper left corner to identify the voting TSRS retiree.**

Completed ballots must be mailed to the Election Committee at the post office box identified at the bottom of the ballot, in a sealed envelope. The ballot envelope must be postmarked before the voting deadline.

It shall be the duty of the Election Committee to verify that the name of the voter appearing on the envelope is a TSRS member and has not voted more than once, and that there are no obvious signs of tampering with a ballot or return envelope. The sealed envelopes shall be kept in a secure location pending tabulation of the ballots. After the expiration of the voting deadline, voting shall be closed and the ballots shall be tallied by the Election Committee. The Election Committee shall report election results to nominees, and the Chairman of the CTRA Executive Board no later than December 13^{th}.

Completed election ballots, and those declared “void”, shall be kept on file for thirty (30) days. At the expiration of 30 days, ballots may be destroyed.

5.5 The CTRA Executive Board shall notify the Chairman of the TSRS Board of Trustees no later than December 15th of the election results and the name of the retiree elected to serve as the TSRS Board Retiree Representative. The elected Retiree Representative shall be notified in writing by the TSRS Administrator of the election results and informed that his/her term of office begins with the January meeting of the TSRS Board of Trustees.

5.6 No member shall be entitled to vote by proxy.

5.7 No member shall have more than one vote.

5.8 A ballot shall be considered totally void and shall not be counted if the voting member votes for more than one candidate.

5.9 A ballot shall be considered totally void and not counted if mailed envelope does not show identification of voter, is submitted by non-TSRS retiree, or is postmarked after voting deadline.

5.10 The candidate receiving the most votes shall be declared the Retiree Representative elected to serve a 3-year term on the TSRS Board of Trustees

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5.11 The Chairman of the CTRA Executive Committee shall appoint two retirees to serve as election monitors. They will monitor the activities of both the Nominating Committee and Election Committee to ensure compliance with approved process. The election monitors will report findings and recommendations to the CTRA Executive Committee.

5.12 Should an incumbent be unable to fulfill his term of office for any reason, the CTRA Executive Board shall appoint a replacement to fill the unexpired term. At the expiration of the regular term, an election will be held to fill the vacancy.

6.0 OFFICERS

6.1 Chairman

(a) The Chairman shall preside at all meetings and hearings. In the event of absence or disability of the Chairman, the Vice-Chairman shall preside. In the absence of both, the members shall appoint a Chairman.

(b) The Chairman may designate members of the Board to make personal inspections when necessary from time to time and, unless otherwise directed by a majority of the Board, shall appoint such committees as may be found necessary.

(c) The Chairman shall report on all official transactions that have not otherwise come to the attention of the Board.

(d) The Chairman shall, subject to these rules and further instructions from the Board, direct the official business of the Board, supervise the work of the Secretary, request necessary help, direct the work of staff and exercise general disciplinary power.

6.2 Vice Chairman

(a) The Vice-Chairman shall be the senior elected employee-representative and shall perform the Chairman's duties in his/her absence.

6.3 Secretary

(a) TCC Sec. 22-46 specifies that the Director of Finance shall serve as Secretary to the Board. However, the operation and administration of the System falls under the Department of Human Resources following the City's most recent reorganization and the duties of the Secretary to the Board have been delegated to the System Administrator, as further detailed in Board Rule 16.0.

6.4 System Administrator

(a) The System Administrator is charged with the administration of the system and the oversight of the City's retirement office and personnel, as set forth in TCC Section 22-48.

(b) The System Administrator, or designee, is charged with the responsibility of keeping all members of the system informed of their obligations, rights and retirement options.

(c) The System Administrator, or designee, may advise and inform a member of the various ramifications of retirement options but will not advise the member as to the option to select. While assistance may be rendered to a member in recording his designation, final responsibility for the legal effect thereof shall rest solely with the member.

7.0 BOARD MEETINGS

1. The Board may conduct a meeting and take official action when a quorum of Board members are present. The Board consists of seven (7) voting members and a quorum shall equal four (4) voting members. In the event that a Board member position is vacant, the quorum shall be adjusted appropriately based on the number of sitting Board members, except as set forth in Rule 7.4 below.

2. The Board shall approve a schedule of regular meetings on an annual basis.

(a) Regular meetings of the Board typically shall be held at 8:30 a.m. on the fourth Thursday of each month.

(b) The Board's annual retreat typically shall be held on a Friday in October, in place of the regular meeting for that month.

(b) The System Administrator may modify the Board meeting schedule when necessary to accommodate legal holidays and scheduling conflicts, with the consent of the Board Chair.

3. Board members must attend meetings in person to participate in discussions and cast votes and no proxies shall be permitted.

4. Any individual serving as the Director of Finance or the Director of Human Resources on an "acting" or "interim" basis shall serve as a voting member of the Board until such time as the Director position is filled by the City. An interim or acting Director shall take all steps necessary to assist in the smooth transition of Board member duties to his or her successor.

5. The Director of Finance and the Director of Human Resources have the ability to send a designee to attend a Board meeting when the Director is not available to attend. Designees shall be selected and participate in Board meetings only on an as needed basis and are not intended to be named on a long term basis. Designees may participate in Board discussions but shall not be counted for purposes of establishing a quorum of Board members, nor shall they vote on Board actions.

6. Special meetings for any purpose may be scheduled and held upon the request of the Chairman or the request of any three members of the Board.

7. Notification of regular and special meetings shall be made pursuant to applicable State statutes.

8. The Board may conduct business in executive session in accordance with A.R.S. Section 38-431.03 and all applicable agenda requirements.

9. Any ratification action by the Board shall be taken only by members of the Board, not including designees.

10. Regular meetings of the Board shall include a call to the audience to permit limited public comment. Members of the audience who wish to address the Board may speak when recognized by the Board Chair. An audience member who is recognized by the Chair may speak to any matter within the purview of the Board, provided that the audience member identifies himself or herself to the Board, limits his or her comments to no more than 3 minutes and does not engage in disorderly or disruptive conduct. The call to the audience shall be limited to no more than 15 minutes. Any response by the Board to matters raised in the call to the audience shall be consistent with the requirements of A.R.S. Section 38-431.01(H).

11. With the consent of the Chairman, the System Administrator may cancel a scheduled regular meeting of the Board if the Board does not have pressing business that must be addressed in a particular month.

> **(a)** In the event that the Board's regular meeting is cancelled, the pending retirement applications may be ratified by the Chairman of the Board with the consent of the Director of Human Resources or the Director of Finance. The Chairman's ratification of retirement applications and the consent of the Director of Human Resources or the Director of Finance shall be provided to the System Administrator in writing or electronically, and shall not be communicated verbally.
>
> **(b)** Any other regularly scheduled Board business, such as the approval of meeting minutes, review of administrative reports and

expenditures, etc., shall be held until the next regular meeting of the Board.

(c) A report of any retirement application ratifications that are approved pursuant to the alternate procedure set forth in this Rule 7.8 shall be presented to the Board at the next regular meeting of the Board and included in the minutes of such meeting.

8.0 MINUTES

8.1 Minutes of all official meetings of the Board shall be kept and maintained as public records of the Board in accordance with the Arizona Revised Statutes.

8.2 To promote operational efficiency of the Retirement Office and to control administrative costs, minutes of Board meetings may be maintained electronically, through the City Clerk's website.

8.3 Written minutes of Board meetings shall be maintained in a summary fashion, with specific notation of agenda items, Board actions and cross-references to the audio recording of the full Board meeting. Summary transcriptions of the minutes of Board meetings shall be similar in form to Legal Action Reports filed with the City Clerk.

8.4 The Board may, in its discretion and if deemed appropriate for the efficient administration of the System, request that the minutes of a Board meeting, or a portion thereof, be transcribed in detail in lieu of a summary report.

[In response to a question at the Board Retreat, the Legal Action Reports are supposed to be posted by the City Clerk within 3 working days of the meeting. Draft minutes or audio recordings of the meetings also are supposed to be posted by the Clerk within 3 working days of the meeting. Approved minutes are supposed to be posted by the Clerk within 2 working days of the approval.]

9.0 PREPARATION OF ANNUAL BUDGET

9.1 The System Administrator shall prepare and present to the Board an estimated budget addressing the costs of the System as required by TCC Section 22-44(f). The estimated budget for the System shall include the primary administrative expenses of the System, including, but not limited to, professional expenses, investment fees and expenses, staffing costs and professional development fees and expenses for Board members and the System Administrator. The estimated budget shall be prepared in connection with the City's annual budgeting process. After due consideration, the Board shall adopt an operating budget for the administration and operation of the System for the ensuing fiscal year. The approved operating budget shall be presented to Mayor and Council in connection with the Board's annual report on the System.

10.0 DISABILITY RETIREMENT APPLICATIONS

10.1 The Board shall consider and make final determinations regarding all applications for Disability retirement filed by members with the System Administrator.

10.2 Determinations regarding Disability retirement applications shall be made in accordance with TCC Sec. 22-39, including the eligibility and application requirements set forth therein, and the definition of "total and permanent disability" set forth in TCC Sec. 22-30(jj).

10.3 The member applying for Disability retirement shall submit to an independent medical examination by the Board's physician, unless the member has been determined by the Social Security Administration to be totally and permanently disabled, in which case the independent medical examination may be waived in the discretion of the Board.

10.4 The Board may consider a determination of total and permanent disability by the Social Security Administration to be conclusive evidence of a member's Disability under TCC Sec. 22-39, but is not required to do so.

10.5 If an application for Disability retirement is denied by the Board, the Board may reconsider its denial if the member provides the System Administrator with new, relevant information regarding the member's potential Disability within twelve (12) months of the member's date of termination from employment with the City. The Board may, in its discretion, request another examination of the member by the Board's physician or a review of the member's updated Disability application by the Board's physician in connection with a reconsideration of a prior denial.

10.6 Except as set forth in Rule 10.5, the Board's determination regarding a Disability retirement application shall be final and binding on all parties.

10.7 Members who are approved for Disability retirement are subject to the disability verification procedures conducted by the System Administrator in accordance with TCC Sec. 22-39(e).

11.0 RESERVED POWERS AND DELEGATIONS OF AUTHORITY

11.1 Powers Reserved for the Mayor and City Council

(a) Design Terms and Conditions of TSRS

(b) Amend, Modify and Terminate TSRS

(c) Set Member Contribution Rate

(d) Set Employer Contribution Rate

(e) Appoint TSRS Board Chair

11.2 Powers Granted to TSRS Board

(a) Administration, Management and Operation of TSRS in accordance with TCC Sec. 22-44(a)

(b) Investment of TSRS assets

(c) Establish and Maintain Investment Policy

(d) Determine, Monitor and Adjust Actuarial Assumptions

(e) Establish and Maintain Funding Policy

(f) Certify Required Annual Contributions from Members and City, Based on Annual Valuation by TSRS Actuary

(g) Recommend Member Contribution Rate

(h) Recommend Employer Contribution Rate

(i) Select, Monitor, Remove and Replace TSRS Service Providers

(j) Provide recommendations and guidance to City Management regarding TSRS Personnel

(k) Conduct TSRS Board Meeting and Set Agendas

(l) Adopt and Maintain TSRS Administrative and Investment Policies

(m) Ratify Retirement Applications

(n) Determine Eligibility for Disability Pensions

(o) Manage IRS and Other Legal Compliance Issues

(p) Make recommendations to the Mayor and City Council regarding discretionary and required changes to the City Code

(q) Conduct Hearings and Make Determinations Regarding Member Benefits

11.3 Powers Granted to City Management

(a) Collect Member Contributions and Transmit to TSRS Trust

(b) Collect Employer Contributions and Transmit to TSRS Trust

(c) Oversee and manage TSRS System Administrator and Staff

11.4 Powers Delegated to TSRS System Administrator

(a) Administer, Manage and Operate TSRS as delegatee of Board's authority under TCC Sec. 22-44(a)

(b) Provide TSRS System Information to Members and Beneficiaries

(c) Enroll Members in TSRS

(d) Collect and Maintain Beneficiary Designations and Member Pension Elections

(e) Maintain Database of Member Information

(f) Determine Benefit Eligibility and Perform Benefit Calculations

(g) Approve Member Service Purchases

(f) Make Benefit Payments When Due to Members and Beneficiaries

(g) Facilitate Transfers of Assets and Liabilities to State Retirement Systems as Needed

(h) Compile Information Necessary for, and Assist TSRS Board in Conducting Review of, Disability Pension Applications

(i) Respond to Inquiries from Members, Beneficiaries, City Officials

(j) Recommend Administrative Policies and Fee Assessments to TSRS Board

(k) Manage IRS Compliance Requirements for Individual Member Benefits and for TSRS System Tax Status

(l) Manage TSRS Board Meeting Schedule and Prepare Board Meeting Materials

(m) Create, Retain and Manage TSRS Records

(n) Manage TSRS Staff Budget and Resources

(o) Facilitate Service Provider Contracts and Payments

(p) Interface with TSRS Actuary and Legal Counsel as Needed

(q) Make Regular Reports on Administrative Activities to TSRS Board

11.5 Powers Delegated to TSRS Investment Manager

(a) Monitor TSRS System Investments

(b) Work with TSRS Investment Consultant and Investment Providers to Oversee Investment of TSRS Assets in Accordance with TSRS Investment Policy

(c) Monitor and Manage Liquidity Requirements for TSRS Benefit Payments

(d) Facilitate Movement of TSRS Assets

(e) Assist TSRS Board in the Selection, Review and Replacement of Investment Providers

(f) Interface with TSRS Investment Consultant and Investment Providers as Needed

(g) Make Regular Reports on Investment Activities to TSRS Board

GOVERNANCE POLICIES

Purpose: The TSRS Board strives to administer the System appropriately, competently and in the best interests of the TSRS members and beneficiaries. The Board desires to document its governance policies in an effort to provide Board members with a clear understanding of their responsibilities and to create a transparent environment in which the Board can operate can carry out its duties.

Authority: The Board is created and authorized pursuant to TCC Sec. 22-44. The Board has been granted the power and authority necessary to effectuate the administration, management and operation of TSRS, as well as the power and authority to construe, interpret and implement the TCC provisions which constitute the System. TCC §22-44(a). The Board also has the full power and authority to prudently invest the System assets. TCC §22-45.

Definition of Fiduciary: In the context of TSRS, a fiduciary is a person who exercises discretionary authority in the administration of TSRS benefits and liabilities or the management (including custody, payment and investment) of TSRS assets.

Governance Policies:

1. Attendance

All Board members are expected to attend all Board and any applicable committee meetings. While attendance is not always possible, Board members should note any scheduling conflicts as soon as reasonably possible and attempt to manage their schedules to avoid creating additional conflicts. When absence from a Board meeting is unavoidable, the Director of Finance and the Director of Human Resources are permitted to send a designee to attend the meeting in his or her place, subject to the restrictions of Board Rule 7.0. Other Board members are not authorized to send designees to attend Board meetings in their place.

2. Committee Service

Each Board member should serve on committees as requested by the Board Chair.

3. Preparation

Board members should come to Board meetings having read the materials prepared and circulated by the System Administrator and Board consultants, and having asked any questions of TSRS staff necessary to the Board members' understanding of the materials.

4. Inquisitiveness

Board members should be inquisitive and should appropriately question staff, advisors and fellow Board members as circumstances require. The inquisitive nature of Board members helps to build the institutional knowledge base of the Board.

5. Integrity

Board members should conduct themselves with integrity and dignity, maintaining the highest ethical conduct at all times.

6. Confidentiality

Board members shall not reveal confidential matters and will not use confidential information for personal gain or for the benefit of outside interests. Board members shall exercise due care with regard to all confidential information in their possession.

7. Knowledge

Board members should develop and maintain their knowledge and understanding of the issues involved in the management of the System. The specific areas in which board members should develop and maintain a high level of knowledge should include:

- Public pension plan governance.
- Asset allocation and investment management.
- Actuarial principles and funding policies.
- Financial reporting, controls and audits.
- Benefits administration.
- Vendor selection process.
- Open meeting and public records laws.
- Fiduciary responsibility.
- Ethics, conflicts of interest and disclosures.

8. Education

Board members should identify areas in which they might benefit from additional education and work with staff to find reasonable and appropriate educational opportunities. Members periodically should attend public sector pension conferences and educational programs and educational sessions provided internally by consultants and special guests. Board members should avail themselves of educational materials available from the System Administrator to keep current on public pension plan issues and topics.

9. Collegiality

Board members shall make every effort to engage in collegial deliberations, and to maintain an atmosphere in which Board or committee members can speak freely, explore ideas before becoming committed to positions and seek information from staff and other members. Board members should approach issues impacting TSRS with an open mind.

10. Mentoring

Any new Board member may request a mentor to assist him or her in becoming familiar with his or her responsibilities on the Board. If a request is made, the Board chair will designate one experienced current or former Board member to be a mentor to the new Board member for a period of one year.

The mentor will be available to the new Board member outside of regularly scheduled board meetings, for consultation or discussion on a reasonable basis.

11. Open and Accountable to Members and the City.

Board members shall be appropriately open in the way key decisions are made and publicly disclosed. The Board shall conduct its business in accordance with the Arizona Open Public Meeting Law, as summarized in Board Rule 14.0. The Board is accountable to both System members and the City for their performance in accordance with the applicable provisions of the TCC and these Governance Policies.

12. Public Statements

Board members shall not make public statements on behalf of the Board or TSRS without the advance authorization of the Board. Any public statements made by Board members on behalf of the Board shall be identified clearly as statements on behalf of the Board, in its fiduciary capacity as the TSRS Trustee. Any public statement by an individual Board member that relates to TSRS business and is not made on behalf of the Board shall be identified clearly as a statement of the individual Board member, not on behalf of the Board. When making a public statement regarding TSRS, Board members shall exercise due care and be mindful of public perceptions of the Board member's authority and any potential conflict of interest issues.

13. Duty of Loyalty

Board members staff shall discharge their duties with respect to the System solely in the interest of the TSRS members, retirees and beneficiaries for the exclusive purpose of:

- Providing benefits to members and beneficiaries.
- Defraying reasonable expenses of administering the plan.

14. Duty to Act Prudently

Board members must discharge their duties with the same care, skill and diligence under the circumstances then prevailing which a prudent person acting in a like capacity and familiar with the matters at hand would use in the conduct of an activity of like character and purpose. This requires:

- Undertaking an appropriate analysis of a proposed course of action, including determination of the relevant facts, considering alternative courses of action and obtaining expert advice as needed.
- Acting in accordance with the laws, documents and instruments governing the System.

15. Duty to Invest Prudently

The Board must invest the TSRS assets prudently and productively, in a manner consistent with portfolio management theory. Working with qualified investment consultants, the Board shall invest TSRS assets in accordance with the TSRS Statement of Pension Investment Policy and Objectives, and shall keep such Statement up to date and consistent with current investment goals and strategies.

16. Exclusive Purpose of Systems Assets

The assets of the System shall never inure to the benefit of the City and shall be held for the exclusive purposes of providing benefits to members and beneficiaries and defraying reasonable expenses of administering the System.

17. Prohibitions Against Self-Dealing

Board members shall not do any of the following:

- Deal with the assets of the System in their own interest or for their own account.
- In their individual, or any other capacity, act in any transaction involving TSRS on behalf of a party, or represent a party, whose interests are adverse to the interests of the System or the interests of the members and beneficiaries.

- Receive any consideration for their personal account from any party conducting business with the System in connection with a transaction involving TSRS assets.

18. Avoidance of Conflicts of Interest/Appearance of Conflicts of Interest

Individuals appointed to serve on the Board bring specialized information and knowledge to the Board from their positions with the City and from their represented constituencies. However, when sitting as a Board member, the member must take all reasonable steps to avoid both actual conflicts of interest and the appearance of conflicts of interest as they carry out their Board duties for the exclusive benefit of TSRS members and beneficiaries. Board members shall conduct themselves in accordance with the Conflict of Interest Policy set forth in Board Rule 15.0.

19. Delegations of Authority

The individual members of the Board cannot reasonably perform all acts necessary to operate TSRS; they must rely on TSRS staff and contractors to carry out many activities and functions. Accordingly, the Board may delegate authority to committees of its members, the System Administrator and outside consultants and contractors. Delegations must be prudent and consistent with the Board's fiduciary responsibilities. The Board shall (a) select delegates with care, (b) define delegated authority clearly, (c) monitor the performance of delegates, and (d) take corrective action when appropriate. Board Rule 11.0 identifies the powers reserved by the City Council and active delegations from the Board.

20. City of Tucson Code of Ethics

All Board members and the System Administrator shall comply with the City of Tucson Code of Ethics adopted August 6, 2013 by Ordinance No. 11102.

ARIZONA OPEN PUBLIC MEETING LAW SUMMARY
(A.R.S. SEC. 38-431, ET SEQ.)

It is the policy of the State of Arizona that meetings of public bodies be conducted openly. Notices and agendas are to be provided for such meetings and must contain information necessary to inform the public of the matters to be discussed or decided. All or any part of a public meeting of a public body may be recorded by any person in attendance by means of a tape recorder, camera or other means of sonic reproduction, provided that there is no active interference with the conduct of the meeting. A "Meeting" means the gathering, in person or through technological devices, of a quorum of members of a public body at which they discuss, propose or take legal action, including any deliberations by a quorum with respect to such action. The definition of a meeting was modified by the Arizona Legislature in 2000 to prohibit a quorum of a public body from secretly communicating through technological devices, including facsimile machines, telephones and electronic mail.

1. Public Bodies Defined

The TSRS Board is a “public body” for purposes of the Open Public Meeting Law. "Public body means the legislature, all boards and commissions of the state or political subdivisions, all multi-member governing bodies of departments, agencies, institutions and instrumentalities of the state or political subdivisions, including without limitation all corporations and other instrumentalities whose boards of directors are appointed or elected by the state or political subdivision. Public body includes all quasi-judicial bodies and all standing, special or advisory committees or subcommittees of, or appointed by, such public body."

2. Public Notice Requirements

Notice of all meetings, including executive sessions, must be given to members of the TSRS Board and to the public. Generally, notice of meetings must be posted in a public manner no less than twenty-four (24) hours prior to the time of the meeting. Additionally, every year the TSRS Board must file with the City Clerk a disclosure statement indicating where all public notices of meetings will be posted. If preferred, the City Clerk will post notices for the public body in the locations established by the City Clerk for that purpose.

The notice should include the following information:

1. The full name of the TSRS Board. (In general, acronyms or other abbreviations should not be used alone. When a committee of the Board is meeting, include the name of the Board as well as the name of the committee.)

2. The date and time of the meeting.

3. The place of the meeting. (Include the name of the building and floor or suite number [if applicable], street address and City).

If the TSRS Board intends to meet for a specified calendar period on a regular day or date during the period, and at a regular place and time, may post public notice of meetings at the beginning of the period and need not post additional notices for each meeting unless there are changes to the schedule. The notice must specify the period for which the notice is applicable. The City Clerk prepares such a notice at the beginning of each calendar year based upon the contents of the annual disclosure statement filed by each public body. (This method of posting does not satisfy the agenda requirements unless the notice also contains a clear statement that the agenda for meetings will be available at least twenty-four [24] hours in advance of the meeting and a statement as to where and how the public may obtain a copy of the agenda.)

In case of an actual emergency, a meeting may be held upon such notice as is appropriate to the circumstances. Contact the City Clerk for further information.

A meeting may be recessed and resumed with less than twenty-four (24) hours' notice if public notice of the initial session of the meeting is given as required, and if, prior to recessing, notice is publicly given as to the time and place of the resumption of the meeting or the method by which notice shall be publicly given.

3. Agendas

In addition to the public notice requirements, the TSRS Board must provide an agenda of the matters to be discussed, considered or decided at each meeting which must be available to the public a minimum of twenty-four (24) hours prior to the time of the meeting. The agenda must contain a listing of the "specific matters to be discussed, considered or decided at the meeting". General terms such as "personnel," "new business," "old business", etc. may not be used unless the specific matters or items to be discussed are identified. Agendas should “contain such information as is reasonably necessary to inform the public of the matters to be discussed or decided.”

A public body may include items such as "future agenda items" to schedule items for future agendas, or "call to the audience" to designate that part of the meeting at which members of the public may address the public body. Any discussions or decisions regarding a matter brought up under "future agenda items" or "call to the audience" should be rescheduled for a later meeting in order to properly agendize the item.

The Open Meeting law allows the Board chair or presiding Board member to present a brief summary of current events without listing in the agenda the specific matters to be summarized, provided that the summary is listed on the agenda and that the Board does not propose, discuss, deliberate or take legal action at that meeting on any matter in the summary unless the specific matter is properly noticed for legal action.

The agenda may be made available to the public by including it as part of the notice of the meeting or by stating in the notice how the public may obtain a copy of the agenda. Changes in the agenda must be prepared and distributed in the same manner as the original agenda at least twenty-four (24) hours prior to the time of the meeting.

Questions regarding content of the agenda should be discussed with the City Clerk.

4. <u>Record of Meetings</u>

The TSRS Board must maintain minutes of all meetings held either in the form of a taped recording (with supplemental notes, if necessary) or a written record. The record of the meeting must be available for public inspection within three (3) working days after the meeting. The minutes of a public meeting must include the following information:

(a) The date, time and place of the meeting;

(b) The members of the public body recorded as either present or absent;

(c) A general description of the matters discussed or considered. The Law requires that minutes contain information regarding matters considered or discussed at the meeting even though no formal action or vote was taken with respect to the matter;

(d) An accurate description of all legal actions proposed, discussed or taken and the names of members who proposed each motion. This does not require that the name of each member who votes on a motion be indicated but only that the member who proposed it be shown in the minutes. Generally, however, the Board, for its own benefit, will include the names of the member who seconded the motion and those who voted in favor of or against the motion. In any case, the minutes must reflect how the Board voted and the numerical breakdown of the vote (for example: 3 in favor, 1 against, 1 abstention);

(e) "Legal action" means a collective decision, commitment or promise made by a majority of the Board members pursuant to the Tucson City Code, other authority of the Board, and the laws of this state.

(d) The name of each person making statements or presenting material to the TSRS Board and a specific reference to the legal action to which the statement or presentation relates;

(e) If the discussion in the public session did not adequately disclose the subject matter and specifics of the action taken, the minutes of the public meeting at which such action was taken should contain sufficient information so that the public may investigate further the background or specific facts of the decisions.

5. <u>Executive Sessions</u>

Executive sessions may only be held for specific purposes. Notice of the executive session must be given to the members of the TSRS Board, and to the general public in the same manner as all other meetings and must include the specific provision of the law authorizing the executive session.

Once proper notice has been given, the executive session may only be held following a public majority vote of a quorum of the Board members and a public announcement by the Board identifying the specific section of the law authorizing the executive session. The purposes for which an executive session may be called are narrowly defined in the law. Questions regarding holding an executive session should be discussed with the City Clerk.

6. Circumvention of the Open Meeting Law

Discussions and deliberations between less that a majority of the members of the TSRS Board, if used to circumvent the purposes of the Open Meeting Law violate that law. The Board may not circumvent public discussion by splintering the quorum and having separate or serial discussions with a majority of the Board members, whether in person or through technological devices. Board members should refrain from any activities that may undermine public confidence in the public decision making process established in the Open Meeting Law, including any actions that may appear to remove discussion and decision from the public view.

Relevant Arizona Attorney General Opinions:
Ariz. Att'y Gen. Ops. 75-8: All discussions among a majority of Board members subject to Open Meeting Law requirements.
Ariz. Att'y Gen. Ops. 78-1: Public participation in open meetings.
Ariz. Att'y Gen. Ops. I79-45: Changes to the agenda and timely publication.
Ariz. Att'y Gen. Ops. I79-49 and I96-012: Right of affected individuals involved in personnel matters before the Board.
Ariz. Att'y Gen. Ops. I90-19: Placing legal advice executive session notification on agenda.
Ariz. Att'y Gen. Ops. I90-058, I87-038; I87-131: Handling confidential records.
Ariz. Att'y Gen. Ops. I91-033. I83-135: Board member telephonic participation in meetings.
Ariz. Att'y Gen. Ops. I99-006: Limitations on responses to issues raised in call to the public.
Ariz. Att'y Gen. Ops. I05-004: Email to and from Board members.
Ariz. Att'y Gen. Ops. I07-013: Comments to the media regarding issues before the Board.

CONFLICT OF INTEREST POLICY

1. Individual Board members are fiduciaries and trustees. As such, Board members will at all times act in the best interest of TSRS and its members and beneficiaries, consistent with the Board member's fiduciary duty, and take positive steps to prohibit breaches of duty through negligence or intentional action.

2. Board members will never act where the Board or the individual member has determined that a conflict of interest exists. A conflict of interest is understood to be a situation where a relationship exists that could reasonably be expected to diminish independence of judgment in performance of official responsibilities as a Board member.

3. Board members may not participate in decisions which might result in significant personal economic advantage.

4. An ex-officio member shall not use his or her position with the City to influence Board or TSRS decisions in which the City has a material financial interest, or where they have a duty or responsibility that may give the appearance of a conflict of interest.

5. Board members will take positive steps to prohibit unauthorized communications with and from individuals seeking to influence the Board or who may receive personal benefit or gain as a result of Board actions.

6. To avoid the appearance of undue influence, Board members will refrain from communications with staff, outside of a Board or committee meeting, wherein the Board member advocates for or directs a specified action, decision or course of conduct regarding any existing or prospective investment transaction, benefit payment, service contract or other System transaction. The foregoing is not intended to place limitations on a Board member's ability to work with staff on routine Board members or to request public information.

7. Board members will not seek nor accept any compensation or political contributions that would violate Arizona or City law.

8. Board members shall not solicit or accept any gift, service, favor anything of value, or any compensation for any service rendered in connection with that individual's Board duties and responsibilities. Board members shall not accept or solicit, directly or indirectly, anything of economic value such as a gift, gratuity, favor, entertainment or loan that may appear to be designed to influence the Board member. This provision does not prohibit acceptance of minor promotional items such as calendars and pens; food and refreshments delivered as a gift to the work place for consumption on the premises by all employees at the work place; and business meals paid for by vendors or consultants in the normal course of business.

9. Each Board member shall have the authority to call an actual or perceived conflict to the attention of the Board for discussion and consideration. Similarly, the Board chair shall have the authority to ask whether any Board member has a conflict to disclose prior to discussion or action on any Board item.

10. Any Board member who is affected by an actual conflict of interest must (i) inform the Board of the conflict and (ii) refrain from voting upon or otherwise participating in the Board decision or action.

FUNDING POLICY
(As Adopted by the Board of Trustees November 17, 2016)

I. Intent and Summary

The Tucson Supplemental Retirement System is a defined benefit pension plan maintained for the benefit of City of Tucson employees. TSRS is governed by provisions of the Tucson City Code, the public pension protections included in the Arizona Constitution, and the Internal Revenue Code. Within that framework, the TSRS Board has adopted a Funding Policy to ensure that TSRS will remain sustainable and to assist in the accumulation of adequate resources to fund the costs of TSRS benefits.

The costs of defined benefit pension benefits generally fall into three categories:

1. The cost of pension benefits earned by employee members each year, referred to as the “normal cost” of benefits;
2. The unfunded liabilities that have accumulated in the retirement program over time, as the retirement program grows and benefit liabilities exceed the assets held in the program; and
3. The administrative costs of operating the retirement program.

These cost elements are funded on an annual basis through a combination of employer contributions, employee contributions and investment returns.

Intent

The intent of the TSRS Funding Policy is to set forth the policies and practices that will be used to determine City and employee member contributions to TSRS each year. Contributions calculated in accordance with the Funding Policy will be designed to achieve full funding of the TSRS benefit liabilities over a prudent time horizon, while balancing the goals of:

- Maintaining retirement benefit security;
- Incorporating experience based actuarial assumptions into all contribution calculations;
- Keeping contribution rates relatively stable on an annual basis; and
- Allocating contribution costs in an equitable manner to mitigate intergenerational transfers of retirement program liabilities.

Summary

It is the goal of the Board to increase the funded status (the ratio of the assets to the accrued liabilities) of TSRS. Under the TSRS Funding Policy, the Actuarially Determined Contributions (as detailed in the annual actuarial valuation report) calculated for the City and the employee members include the payment of:

a. The normal cost of benefits;
b. The annual amortized payment on TSRS' unfunded liabilities, calculated over a 20 year open, level percent of pay amortization policy;
c. The reasonable and appropriate annual administration costs of TSRS; and
d. The additional contribution element attained through the rounding of employee member and City Contribution Rates pursuant to the Board's rounding policy, which is designed to assist with the achievement of the full funding of TSRS over a reasonable timeframe.

II. <u>Funding Policy Goals</u>

The TSRS Funding Policy is designed to provide assurance that TSRS will remain viable and sustainable, and that the cost of the benefits provided by TSRS will be funded in an equitable manner. The TSRS funding policy is based on the following primary principles:

A. The Board intends to encourage the City to extinguish the TSRS unfunded liability within a target timeframe of fiscal year 2025 to 2030. While the Board recognizes that investment markets and returns have a significant impact on the funded status of TSRS and cannot be predicted, the Board intends to use the target timeframe as a tool to measure success in the reduction of the unfunded liability. If and when the TSRS actuarial valuation shows that the unfunded liability will not be extinguished within the target timeframe, the Board will review closely the actuarial assumptions and investment policies to determine if adjustments should be made.

B. The Board will work toward the extinguishment of the unfunded liability by recommending that the City contribution to TSRS exceed the amount that the City is required to appropriate and pay to TSRS pursuant to the Tucson City Code ("TCC"), and the annual City contribution to TSRS be a minimum of 27.5% of payroll.

C. The TSRS Board wishes to demonstrate accountability and transparency by communicating all of the information necessary for assessing the City's progress toward meeting its pension funding objectives.

III. <u>Authority</u>

The Board has been granted the power and authority necessary to effectuate the administration, management and operation of TSRS. TCC §22-44(a). The Board is required to certify to the City Manager the Actuarially Determined Contribution ("ADC"), the Required Member Contribution Rate(s) and the Required City Contribution.[1] TCC §22-35(b). The City is required, pursuant to TCC Section 22-30(t), to appropriate and pay over to TSRS 100% of the Required City Contribution.

IV. <u>Policy</u>:

The Board shall determine the Recommended Member Contribution Rates and the Recommended City Contribution Rates in accordance with all applicable provisions of the TCC and the terms of this Funding Policy as set forth below. The Funding Policy takes into account the following three core elements in the calculation of the recommended annual contributions to TSRS: the Actuarially Determined Contribution, administrative expenses and the Board's rounding policy.

A. <u>Actuarially Determined Contribution</u>. The ADC is the annual amount necessary to pay the sum of the employer normal cost, the employee segment normal cost amounts and the amortization requirements for the TSRS unfunded accrued

[1] The Actuarially Determined Contribution is referred to in the TCC as the "annual required contribution." The Required City Contribution Rate is referred to in the TCC as the "employer contribution."

liability, determined on a fiscal year basis by the System's actuary in accordance with the following actuarial assumptions:

1. **Actuarial Cost Method**. The actuarial cost method is the individual entry age normal cost method, level percent of pay. This method conforms to the actuarial standards of practice and allocates normal costs over a period beginning no earlier than the date of employment and does not exceed the last assumed retirement age. This cost method fully funds the long-term costs of the promised benefits of the employees' period of active service.

2. **Asset Valuation Method**. To minimize the volatility effect of contribution rates affected by investment gains or losses during the year, the Board has adopted a smoothing process that involves spreading the difference between actual and expected market returns over a five year period to determine the actuarial value of assets.

3. **Amortization Policy**. The Board has adopted a 20 year open, level percent of pay amortization policy. A single unfunded amount is determined with each actuarial valuation, and that amount is then amortized over a 20 year period, assuming that the contribution amounts will remain level as a percent of the total payroll (so the dollar amount of the contribution is assumed to grow each year). When the 20 year open amortization policy is combined with the Contribution Rounding Policy set forth in Section IV.C. below, the Board's amortization policy is a hybrid approach, designed to fully extinguish the unfunded liability in a similar but more flexible manner than a closed amortization policy. The Board's amortization policy has been in place since July 1, 2013.

B. Administrative Expenses. The annual administrative expenses incurred by the System, based on the administrative operating budget approved by the Board in advance of the fiscal year and determined as of the end of the fiscal year, shall be included in the calculation of the Recommended City Contribution Rate in accordance with sound actuarial principles. Administrative expenses paid by the System and included in the calculation of the ADC shall be reasonable and appropriate, and shall include staff salaries and related overhead expenses, actuarial, legal and other professional consulting fees, accounting charges, compliance expenses, and other fees and expenses necessary for the efficient administration of the System. Investment fees and expenses shall not be included in the calculation of the Recommended City Contribution Rate

C. **Contribution Rounding Policy.** The Board's rounding policy is intended to (1) minimize volatility in the Member Contribution rates and the related impact on the net take home pay of employees, (2) eliminate minor adjustments in contribution rates, and (3) recognize the inherent timing gap between actuarial valuation data and the effective date of new contribution rates.

1. **Recommended Member Contribution Rates:** Recommended Member Contribution Rates for members hired prior to July 1, 2006 (the "Legacy Members"), members hired between July 1, 2006 and June 30, 2011 ("Tier I Members"), and members hired on or after July 1, 2011 ("Tier II Members") shall be determined by the System actuary pursuant to TCC Section 22-34. The Legacy Members contribute 5% of pay, and there are no further adjustments to Legacy Member contribution rates; i.e., the Required Member Contribution Rate and the Recommended Contribution Rate for the Legacy Members are the same.
The Tier I Members and Tier II Members are referred to collectively as the "Variable Contribution Tier Members," and they make Member Contributions equal to a percentage of the normal cost for their particular

   Tier. The percentage applicable to the Variable Contribution Tier Members currently is set at 50%, but can be changed by the City in accordance with Section 22-34(b) of the TCC. In no event shall the Variable Contribution Tier Members contribute less than 5% of pay as set forth in TCC §22-34(a) and (b).

   The Recommended Member Contribution Rates for Variable Contribution Tier Members are subject to the Board's rounding policy. The normal cost for Tier I Member and for Tier II Members are calculated by the System actuary and then multiplied by the applicable Member Contribution Percentage (currently 50%). The result of that calculation is the Recommended Member Contribution Rate required for the Variable Contribution Tier Members under the TCC.
The Board will then review the Required Member Contribution Rates for the Variable Contribution Tier Members and apply the rounding policy. Pursuant to the rounding policy, the Required Member Contribution

Rates for the Variable Contribution Tier Members will be rounded up to the nearest 0.25%. The Recommended Member Contribution Rates for Variable Contribution Tier Members shall never be less than the Required Member Contribution Rate for that member group (for that same fiscal year). The Recommended Member Contribution Rates will be recommended by the Board to the City for the upcoming fiscal year.
Examples:

Year 1:	Required Member Contribution for Tier I Member:	6.67% of pay
	Recommended (Rounded) Member Contribution for Tier I Member Contribution:	6.75% of pay
Year 2:	Required Member Contribution for Tier I Member Contribution Rate:	6.48% of pay
	Recommended (Rounded) Member Contribution for Tier I Member Contribution:	6.50% of pay

2. **Recommended City Contribution Rates**: Pursuant to TCC Section 22-30(t), the City is required to fund the Required City Contribution for a particular fiscal year, which equals the difference between the ADC and the Required Member Contribution rate(s). For purposes of determining the Recommended City Contribution Rate that will be recommended by the Board to the City, the System actuary will be asked to prepare the following calculations:

   Because there are three different Required Member Contribution Rates, the System actuary shall calculate a Required City Contribution Rate for each member group (which is the Required City Contribution Rate for each group) and a blended Required City Contribution Rate for the entire member population. In no event shall the blended Required City Contribution Rate for the entire member population be less than the Required City Contribution Rate for any member group.
   The Board will then review the blended Required City Contribution Rate and set the Recommended City Contribution Rate for the upcoming fiscal year. The Recommended City Contribution Rate will equal the

blended Required City Contribution Rate, rounded up to the nearest 0.50. The Recommended City Contribution Rate shall be rounded up to the nearest 0.50 instead of the nearest 0.25 because the Required City Contribution Rates are based on a blend across the three groups of members. The Recommended City Contribution Rate shall never be less than the Required City Contribution rate for any member group for that same fiscal year.
Example:

Required City Contribution Rates
for three member groups:

Legacy Members:	27.22% of pay
Tier I Members:	25.55% of pay
Tier II Members:	27.08% of pay

Actuarially Calculated Blended City Contribution Rate 26.95%

Recommended (Rounded) City Contribution Rate: 27.50% of pay

(Recommended Rate is not set at 27.0% because that would be less than the Required Rate for two of the member groups)

3. **Funded Status of TSRS**: It is the goal of the Board to increase the funded status of TSRS. The Board anticipates that Required Member Contribution Rates and the Required City Contribution Rates may decrease from time to time, based on various actuarial factors. The Board will not decrease its Recommended Member Contribution rates or its Recommended City Contribution Rate until such point as TSRS is fully funded. At that time, the unfunded accrued liability will have been extinguished, and the ADC will represent the payment of the normal cost of benefits only. Moreover, the Board shall decrease the Recommended Member Contribution Rates for the Variable Contribution Tier Members only to the extent that the Recommended Member Contribution Rates for Tier I Members and Tier II Members decrease simultaneously, in the same percentage of pay.

TSRS ACTUARIAL ASSUMPTIONS

A. To determine the value of actuarially equivalent member benefits under TCC Sec. 22-30(d) (Definition of “Actuarial Equivalent”), the following actuarial assumptions shall continue to be applied, effective as of July 1, 2016:

Interest Rate: **7.25%**

Mortality Table: **Mortality Table: RP-2000 Combined Mortality Table for males and females projected with Scale BB to 2020**

B. The foregoing actuarial assumptions are adopted in accordance TCC Chapter 22, Sec. 22-30(d) and are incorporated into this Board Rule as required pursuant to Section 401(a)(25) of the Internal Revenue Code of 1986, as amended.

FUNDING POLICY GLOSSARY OF TERMS AND CONCEPTS

1. **Actuarial Cost Method**: the method used by the actuary to allocate total benefit costs between employees' past and future service. The actuarial cost method determines the normal cost for a year.

2. **Accrued Liability**: the present value of retirement benefits earned by employees for past service.

3. **Actuarial Value of Assets:** the value of pension assets for purposes of actuarial valuations and funding calculations, which takes into account certain actuarial assumptions such as smoothing investment returns over a stated period.

4. **Actuarially Determined Contribution**: the annual contribution to the plan necessary to pay the normal cost and the annual amortization payment on any unfunded accrued liability, which may be less than the annual contribution recommended by the Board after full application of the Funding Policy.

5. **Amortization**: the process of paying off the unfunded accrued liability over time. Please refer to Section IV.A.3. of the Funding Policy for an explanation of the hybrid amortization policy used by TSRS.

    (a) **Closed Amortization:** using a specific number of years to determine annual payments intended to extinguish debt and the number of years remaining in the amortization schedule decline to zero.

    (b) **Open Amortization**: using a period of years that does not change over time to determine annual contributions to pay down the unfunded accrued liability. With each annual calculation, the period of years used to determine the payment is reset to the original period; the number of years in the amortization schedule does not decline to zero.

Example: Assume that $1,000,000 in liability is being amortized over 5 years. Following is a simplified illustration of the difference between Open and Closed Amortization Schedules:

	Closed Amortization			Open Amortization		
	Starting Liability	Amortization Payment	Ending Liability	Starting Liability	Amortization Payment	Ending Liability
Year 1	$1,000,000	$200,000	$800,000	$1,000,000	$200,000	$800,000
Year 2	$800,000	$200,000	$600,000	$800,000	$160,000	$640,000
Year 3	$600,000	$200,000	$400,000	$640,000	$128,000	$512,000
Year 4	$400,000	$200,000	$200,000	$512,000	$102,400	$409,600
Year 5	$200,000	$200,000	$0	$409,600	$81,920	$327,680

6. **Contribution Rate**: the amount to be contributed to TSRS annually, expressed as percentage of payroll.

   (a) **Required City Contribution Rate:** the City contribution rate calculated by the actuary in accordance with the applicable provisions of the Tucson City Code.

   (b) **Recommended City Contribution Rate:** the City Contribution rate recommended by the Board after the rounding policy has been applied, which may be more than the required rate.

   (c) **Required Member Contribution Rate:** the Member Contribution rate for a particular group of members (Legacy, Tier I or Tier II Members) calculated by the actuary in accordance with the applicable provisions of the Tucson City Code.

(d) **Recommended Member Contribution Rate:** the Member Contribution rate recommended by the Board for Tier I Members or Tier II Members after the rounding policy has been applied, which may be more than the required rate.

7. **Entry Age Normal Cost Method**: the actuarial cost method which produces the normal cost of an employee's retirement benefits as a level percent of pay, beginning at the employee's age when he or she enters the plan and continuing until the employee reaches retirement age.

8. **Full Funding**: occurs when the unfunded accrued liability is $0 and the funded ratio is 100%.

9. **Funded Ratio or Funded Status**: the ratio of assets available to pay retirement benefits to accrued liability under the plan (liabilities associated with retirement benefits earned by employees).

10. **Legacy Members**: Members hired prior to July 1, 2006 and whose Required and Recommended Member Contribution Rate equals 5% of pay.

11. **Level Percent of Pay**: calculating plan contributions as a consistent percentage of annual payroll costs each year and assuming that future contributions will increase by the same rate as payroll increases.

12. **Market Value of Assets:** the value of pension assets, determined with reference to the value at which the assets would trade or could be sold on an open market.

13. **Member Contribution Percentage:** The percent of the Variable Contribution Tier Members normal cost for which the member is to contribute-effective 6/30/2014 that rate is 50%.

14. **Normal Cost**: the annual present value or costs for benefits earned by employees during the year.

15. **Smoothing**: an actuarial method of spreading out investment gains and losses over a stated period of time, used to average investment returns over the smoothing period and therefore minimize volatility in the calculation of contributions to the plan.

Example: Assume that an investment achieved the following annual returns, and that the investment returns are smoothed over a 5 year period:

Year	Investment Return (parentheses indicate loss)	Annual Amount Recognized in Actuarial Value of Assets (1/5 per year)
2012	($30,000)	($6,000)
2013	$20,000	$4,000
2014	$50,000	$10,000
2015	($20,000)	($4,000)
2016	($30,000)	($6,000)
Total	($10,000)	($2,000)

In the calculation of the actuarial value of the assets for 2016, the market value of the assets will be reduced by a $2,000 investment loss. Without smoothing the investment returns, the market value of the assets would be reduced by a $30,000 investment loss. When the market value of the assets fluctuates widely as a result of investment returns, the contribution obligation to the pension plan also fluctuates widely. Smoothing the investment returns has the effect of stabilizing contribution rates.

16. **Tier I Members:** members hired from July 1, 2006 to June 30, 2011.

17. **Tier II Members:** members hired on or after July 1, 2011.

18. **Unfunded Accrued Liability**: the difference between the assets and the accrued liability.

19. **Variable Contribution Tier Members**: TSRS members who are classified as either Tier I Members or Tier II Members and are required to make Member Contributions which may change over time in accordance with TCC Section 22-34.

Board Policy III. INVESTMENT POLICY STATEMENT	Page 1 of _

[Pending Board Review]

Board Policy IV. POST RETIREMENT BENEFIT INCREASE POLICY	Page 1 of _

[Pending Board Review]

MEMORANDUM

DATE: January 17, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: **Board Member Term Limits and Addition of Elected Retiree Board Member**

This item is continued from the November meeting and a follow up to the October Retreat. Trustee Wysocki has provided the attached letter for Board consideration regarding Board Member term limits and the addition of an elected retiree Board Member. I am seeking separate Board action on each agenda item.

Attachment: Proposal Letter from Jim Wysocki

To: Tucson Supplemental Retirement System Board
From: James C. Wysocki, Trustee
Subject: Proposals for Consideration
Date: November 14, 2018

As requested at the October TSRS Board Retreat, I am enclosing my comments in support of two proposals: first, changing the Board’s governance structure and second, removing the term limits for elected representatives, thereby eliminating term limits for all board members.

1. Adding another elected representative

Approval of this proposal would add an elected representative with full voting rights to the TSRS board. This new trustee would represent the TSRS retired members, and raise the retirees’ representatives from one to two. This change would consequently raise the number of board members from seven to eight.

There are several assumptions which govern the submission of this proposal.

a. There are three principal interest groups within TSRS: active employees, retirees, and City of Tucson (COT) administration.

b. Most of the time the self interests of these three groups are in agreement with one another, but not always.

c. Unconscious biases may occur within the thought processes of each group, even among people of good will. These world views will color each representative’s thoughts about certain topics, and they become accentuated under periods of stress (political, financial, organizational, etc.).

d. These different viewpoints must be balanced among the board members through a thorough process of discussion and negotiation. Doing so generally combines board members’ best thought processes. This reconciliation of conflicting positions should be able to best serve the long-term interests of the TSRS interest groups as a whole.

So the first reason to increase the size of the board by one is to ensure that board decisions receive the most thorough analysis possible. This would make it more difficult for one group of board members to pass their proposals too easily, which would then force the board into a more intensive coalition-forming effort among the three constituencies.

The second reason is that adding another trustee to the board would follow along with the ratio of retired members to active COT employees. COT administration’s current method of cost control is to reduce the number of FTE employees, and given the City’s current revenue sources and income streams this policy is unlikely to change in the foreseeable future. Thus the policy over the long term will accentuate the proportional decrease in the number of active employees vs. that of the retirees. I believe that this reality needs to be reflected in the composition of the board.

The next reason in favor of this proposal is that adding a retiree board member would represent a fairer distribution of elected representatives, with respect to the overall membership base. Otherwise the retirees would be underrepresented.

Additionally, the change would thereby better balance the overall self-interests of the three interest groups. Currently employed and retired COT employees would have an equal influence within the board. Furthermore, the combined influence of the two employee groups would match that of COT's administration.

Since a proposal would fail with a tied vote, if the COT employee's representatives and the management representatives differed on an issue, the change forces the interest groups (i.e., management, and both the active and retired sectors of the labor force) to talk more and negotiate to a mutually-acceptable resolution.

This revised governance structure would be more difficult to manage politically, but it should result in a more thorough analysis, review, and approvals process. This should enhance the board's ability to better ensure the long-term success of the retirement fund.

2. No term limits

There are two observations that drive this proposal.

First, it can be observed from looking at other boards of directors, that in general the experience and judgment that is derived from having conscientious, seasoned, experienced board members typically can lead to a more effective oversight process.

Second, it can also be observed that the overall interest level of active COT employees in serving on oversight boards of any kind has diminished over time. To my knowledge, during at least the last two recruiting cycles no eligible employee wanted to stand for election to the TSRS board. Nor did any employee nominate another for election to the board. The board therefore had to resort to executive action to fill a vacancy. This is not a desirable situation in which to be.

In the face of the demonstrated lowering of interest levels and participation in TSRS board activities over time, especially among COT's active employees, it has become increasingly difficult to find people who are willing to serve on the board. The elected representatives fully participate in its activities, and their insight and judgment are strong assets. But this only goes so far, since their participation is limited to two successive terms in office. If this proposal were adopted, the TSRS board would not lose the experience and good judgement of its currently term-limited trustees, just at the time when they were getting really good at what they do.

The removal of term limits could also equalize the experience level of the permanent and elected representatives over time, as time-in-service generally increases one's proficiency in discharging the duties of a position. The change would compensate for the low interest in TSRS board participation by the active COT employees.

My request:

In light of the above discussion, I am requesting that both proposals be added to a future board agenda, that their merits and demerits be debated at that meeting, and that the two proposals be voted on for their approval or disapproval. My thanks to the board for their consideration of this request.

MEMORANDUM

DATE: January 18, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: **FY 2018 Comprehensive Annual Financial Report and Audit Results**

This item is for information only. No Board action is required at this time.

The TSRS fiscal year 2018 audit has been completed by Heinfeld, Meech & Co., P.C. The results of the audit did not identify any deficiencies in internal control that the auditors would consider a material weakness. Further, the results of the tests for compliance with certain provisions of laws, regulations, contracts and grant agreements disclosed no instances of noncompliance or other matters that are required to be reported under Government Auditing Standards. Finally, the auditors have not communicated any other deficiencies to me or TSRS staff.

As has been common practice, Retirement staff has prepared the annual Comprehensive Annual Financial Report (CAFR) in accordance with the Government Finance Officers Association (GFOA) standards and has submitted the report to the GFOA for the Certificate of Achievement for Excellence in Financial Reporting. I anticipate notification from GFOA regarding the award in June or July.

I have attached the auditor's letters to the Board as well as an electronic copy of the CAFR. I will also distribute hard copies at the meeting on January 24.

Attachment: Auditor's Report
Communication to Governance
FY 2018 Comprehensive Annual Financial Report

Report on Internal Control Over Financial Reporting and on Compliance and Other Matters Based on an Audit of Financial Statements Performed in Accordance with *Government Auditing Standards*

Independent Auditor's Report

Board of Trustees
Tucson Supplemental Retirement System

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of the Tucson Supplemental Retirement System, a pension trust fund of the City of Tucson, Arizona, as of and for the year ended June 30, 2018, and the related notes to the financial statements, and have issued our report thereon dated December 28, 2018.

Internal Control Over Financial Reporting
In planning and performing our audit of the financial statements, we considered Tucson Supplemental Retirement System's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of Tucson Supplemental Retirement System's internal control. Accordingly, we do not express an opinion on the effectiveness of Tucson Supplemental Retirement System's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. A significant deficiency is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether Tucson Supplemental Retirement System's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Heinfeld, Meech & Co., P.C.

Heinfeld, Meech & Co., P.C.
Tucson, Arizona
December 28, 2018

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December 28, 2018

Board of Trustees
Tucson Supplemental Retirement System

We have audited the Statement of Fiduciary Net Position and the related Statement of Changes in Fiduciary Net Position of Tucson Supplemental Retirement System (System), a pension trust fund of the City of Tucson, Arizona, for the year ended June 30, 2018. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards and *Government Auditing Standards* as well as certain information related to the planned scope and timing of our audit. We have communicated such information in our engagement letter provided to you during the planning phase of the audit. Professional standards also require that we communicate to you the following matters related to our audit.

Qualitative Aspects of Accounting Practices

Management is responsible for the selection and use of appropriate accounting policies. The significant accounting policies used by Tucson Supplemental Retirement System are described in Note 1 to the financial statements. No matters have come to our attention that would require us, under professional standards, to inform you about the methods used to account for significant unusual transactions and the effect of significant accounting policies in controversial or emerging areas for which there is a lack of authoritative guidance or consensus.

Accounting estimates are an integral part of the financial statements prepared by management and are based on management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that future events affecting them may differ significantly from management's current judgments.

The most sensitive estimates affecting the financial statements are:

- The determination of the funded status and net pension liabilities of the System are calculated with actuarial methods and assumptions as applied by the actuary of the System under the supervision of management. We evaluated the key elements of the actuarial methods, assumptions, and underlying participant data in determining the reasonableness of the actuarial valuations performed in relation to the financial statements as a whole.

- Certain investments of non-publicly traded assets managed by external managers are valued using established valuation policies, which may include discounted cash flows methodologies.

We evaluated the key factors and assumptions used to develop these estimates and determined that they are reasonable in relation to the plan financial statements taken as a whole.

Difficulties Encountered in Performing the Audit

We encountered no significant difficulties in dealing with management in performing and completing our audit.

Audit Adjustments
Professional standards require us to accumulate all known and likely misstatements identified during the audit, other than those that we believe are trivial, and communicate them to the appropriate level of management. During the course of the audit we did not identify any misstatements which require communication.

Disagreements with Management
For purposes of this letter, a disagreement with management is a financial accounting, reporting, or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations
We have requested certain written representations from management, which are included in the management representation letter provided to us at the conclusion of the audit.

Management Consultations with Other Independent Accountants
In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the Tucson Supplemental Retirement System's financial statements or a determination of the type of auditor's opinion that may be expressed on those statements, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants regarding auditing and accounting matters.

Discussions with Management
We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management throughout the course of the year. However, these discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention as the System's auditors.

Compliance with Ethics Requirements Regarding Independence
The engagement team, others in our firm, and as appropriate, our firm, have complied with all relevant ethical requirements regarding independence. Heinfeld, Meech & Co., P.C. continually assesses client relationships to comply with relevant ethical requirements, including independence, integrity, and objectivity, and policies and procedures related to the acceptance and continuance of client relationships and specific engagements. Our firm follows the "Independence Rule" of the AICPA Code of Professional Conduct and the rules of state boards of accountancy and applicable regulatory agencies. It is the policy of the firm that all employees be familiar with and adhere to the independence, integrity, and objectivity rules, regulations, interpretations, and rulings of the AICPA, U.S. Government Accountability Office (GAO), and applicable state boards of accountancy.

Responsibility for Fraud
It is important for both management and the members of the Board of Trustees to recognize their role in preventing, deterring, and detecting fraud. One common misconception is that the auditors are responsible for detecting fraud. Auditors are required to plan and perform an audit to obtain reasonable assurance that the financial statements do not include material misstatements caused by fraud. Unfortunately most frauds which occur in an organization do not meet this threshold.

The attached document prepared by the Association of Certified Fraud Examiners (ACFE) is provided as a courtesy to test the effectiveness of the fraud prevention measures of your organization. Some of these steps may already be in place, others may not. Not even the most well-designed internal controls or procedures can prevent and detect all forms of fraud. However, an awareness of fraud related factors, as well as the active involvement by management and the members of the governing body in setting the proper "tone at the top", increases the likelihood that fraud will be prevented, deterred and detected.

Additional Reports Issued

In addition to the auditor's report on the financial statements we will also issue the following document related to this audit. This report is typically issued within 30 days of the date of this letter.

- Report on internal control over financial reporting and on compliance in accordance with *Government Auditing Standards*

Other Important Communications Related to the Audit

Attached to this letter are a copy of the signed engagement letter provided to us at the initiation of the audit, and a copy of the management representation letter provided to us at the conclusion of the audit. If there are any questions on the purpose or content of these letters please contact the engagement partner identified in the attached engagement letter.

Restriction on Use

This information is intended solely for the use of the members of the Board of Trustees and management of Tucson Supplemental Retirement System and is not intended to be, and should not be, used by anyone other than these specified parties.

Very truly yours,

Heinfeld, Meech & Co., P.C.

Heinfeld, Meech & Co., P.C.
Tucson, Arizona

Fraud Prevention Checklist

The most cost-effective way to limit fraud losses is to prevent fraud from occurring. This checklist is designed to help organizations test the effectiveness of their fraud prevention measures.

1. **Is ongoing anti-fraud training provided to all employees of the organization?**
    - Do employees understand what constitutes fraud?
    - Have the costs of fraud to the company and everyone in it — including lost profits, adverse publicity, job loss and decreased morale and productivity — been made clear to employees?
    - Do employees know where to seek advice when faced with uncertain ethical decisions, and do they believe that they can speak freely?
    - Has a policy of zero-tolerance for fraud been communicated to employees through words and actions?

2. **Is an effective fraud reporting mechanism in place?**
    - Have employees been taught how to communicate concerns about known or potential wrongdoing?
    - Is there an anonymous reporting channel available to employees, such as a third-party hotline?
    - Do employees trust that they can report suspicious activity anonymously and/or confidentially and without fear of reprisal?
    - Has it been made clear to employees that reports of suspicious activity will be promptly and thoroughly evaluated?
    - Do reporting policies and mechanisms extend to vendors, customers and other outside parties?

3. **To increase employees' perception of detection, are the following proactive measures taken and publicized to employees?**
    - Is possible fraudulent conduct aggressively sought out, rather than dealt with passively?
    - Does the organization send the message that it actively seeks out fraudulent conduct through fraud assessment questioning by auditors?
    - Are surprise fraud audits performed in addition to regularly scheduled audits?
    - Is continuous auditing software used to detect fraud and, if so, has the use of such software been made known throughout the organization?

4. **Is the management climate/tone at the top one of honesty and integrity?**
   - Are employees surveyed to determine the extent to which they believe management acts with honesty and integrity?
   - Are performance goals realistic?
   - Have fraud prevention goals been incorporated into the performance measures against which managers are evaluated and which are used to determine performance-related compensation?
   - Has the organization established, implemented and tested a process for oversight of fraud risks by the board of directors or others charged with governance (e.g., the audit committee)?

5. **Are fraud risk assessments performed to proactively identify and mitigate the company's vulnerabilities to internal and external fraud?**

6. **Are strong anti-fraud controls in place and operating effectively, including the following?**
   - Proper separation of duties
   - Use of authorizations
   - Physical safeguards
   - Job rotations
   - Mandatory vacations

7. **Does the internal audit department, if one exists, have adequate resources and authority to operate effectively and without undue influence from senior management?**

8. **Does the hiring policy include the following (where permitted by law)?**
   - Past employment verification
   - Criminal and civil background checks
   - Credit checks
   - Drug screening
   - Education verification
   - References check

9. **Are employee support programs in place to assist employees struggling with addictions, mental/ emotional health, family or financial problems?**

10. **Is an open-door policy in place that allows employees to speak freely about pressures, providing management the opportunity to alleviate such pressures before they become acute?**

11. **Are anonymous surveys conducted to assess employee morale?**

HeinfeldMeech
Tucson • Phoenix • Flagstaff
HeinfeldMeech.com

May 24, 2018

Board of Trustees and Management
Tucson Supplemental Retirement System
City of Tucson
PO Box 27210
Tucson, AZ 85726-7210

We are pleased to confirm our understanding of the services we are to provide for Tucson Supplemental Retirement System (System), a pension trust fund of the City of Tucson, Arizona, for the year ended June 30, 2018. We encourage you to read this letter carefully as it includes important information regarding the services we will be providing to the System. If there are any questions on the content of the letter, or the services we will be providing, we would welcome the opportunity to meet with you to discuss this information further.

We will audit the financial statements of the Tucson Supplemental Retirement System which comprise the Statement of Fiduciary Net Position as of June 30, 2018, and the related Statement of Changes in Fiduciary Net Position for the year then ended, and the related notes to the financial statements.

We have also been engaged to report on supplementary information that accompanies the System's financial statements. We will subject the following supplementary information to the auditing procedures applied in our audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America and will provide an opinion on it in relation to the financial statements as a whole:

1. Other Supplemental Information

Accounting standards generally accepted in the United States provide for certain required supplementary information (RSI) to supplement the System's financial statements. Such information, although not part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. As part of our engagement, we will apply certain limited procedures to the System's RSI in accordance with auditing standards generally accepted in the United States of America. These limited procedures will consist of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements.

We will not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance. The following RSI is required by generally accepted accounting principles and will be subjected to certain limited procedures, but will not be audited:

1. Management's Discussion and Analysis
2. GASB-required pension and other post-employment benefits schedules

The following other information accompanying the financial statements will not be subjected to the auditing procedures applied in our audit of the financial statements, and our auditor's report will not provide an opinion or any assurance on that information.

1. Introductory Section, to include the transmittal letter
2. Investment Section
3. Actuarial Section
4. Statistical Section

Audit Objectives

The objective of our audit is the expression of opinions as to whether your financial statements are fairly presented, in all material respects, in conformity with accounting principles generally accepted in the United States of America. We will also report on the fairness of the supplementary information referred to in the second paragraph when considered in relation to the financial statements taken as a whole. Our responsibility in the expression of opinions is to plan and perform the audit to obtain reasonable assurance, but not absolute assurance, that the financial statements are free from material misstatements.

An important aspect to our expression of opinions on the financial statements is understanding the concept of materiality. Our determination of materiality is a matter of professional judgment and is affected by our perception of the financial information needs of users of the financial statements. In this context, it is reasonable for us to assume that users –

1. have a reasonable knowledge of business and economic activities and accounting principles, and a willingness to study the information in the financial statements with reasonable diligence;
2. understand that financial statements are prepared, presented, and audited to levels of materiality;
3. recognize the uncertainties inherent in the measurement of amounts based on the use of estimates, judgment, and the consideration of future events; and
4. make reasonable economic decisions on the basis of the information in the financial statements.

Our audit will be conducted in accordance with auditing standards generally accepted in the United States of America and the standards for financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States, and will include tests of the accounting records of the System and other procedures we consider necessary to enable us to express such opinions. We will issue a written report upon completion of our audit of the System's financial statements. We cannot provide assurance that unmodified opinions will be expressed. Circumstances may arise in which it is necessary for us to modify our opinions or add emphasis-of-matter or other-matter paragraphs. If our opinions are other than unmodified, we will discuss the reasons with you in advance. If, for any reason, we are unable to complete the audit or are unable to form or have not formed opinions, we may decline to express opinions or issue reports, or may withdraw from this engagement.

We will also provide a report (that does not include an opinion) on internal control related to the financial statements and compliance with the provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a material effect on the financial statements as required by *Government Auditing Standards*. The report on internal control and on compliance will include a paragraph that states (1) the purpose of the report is solely to describe the scope of testing of internal control and compliance, and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control on compliance and (2) the report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. The paragraph will also state that the report is not suitable for any other purpose. If during our audit we become aware that the System is subject to an audit requirement that is not encompassed in the terms of this engagement, we will communicate to management and those charged with governance that an audit in accordance with U.S. generally accepted auditing standards and the standards for financial audits contained in *Government Auditing Standards* may not satisfy the relevant legal, regulatory, or contractual requirements.

Audit Procedures - General

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve judgment about the number of transactions to be examined and the areas to be tested. Our tests will not include a detailed check of all of the System's transactions for the period. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We will plan and perform the audit to obtain reasonable rather than absolute assurance about whether the financial statements are free of material misstatement, whether from (1) errors, (2) fraudulent financial reporting, (3) misappropriation of assets, or (4) violations of laws or governmental regulations that are attributable to the System or to acts by management or employees acting on behalf of the System. Because the determination of abuse is subjective, *Government Auditing Standards* do not expect auditors to provide reasonable assurance of detecting abuse.

Because of the inherent limitations of an audit, combined with the inherent limitations of internal control, and because we will not perform a detailed examination of all transactions, there is a risk that material misstatements may exist and not be detected by us, even though the audit is properly planned and performed in accordance with auditing standards generally accepted in the United States of America and *Government Auditing Standards.* In addition, an audit is not designed to detect immaterial misstatements or violations of laws or governmental regulations that do not have a direct and material effect on the financial statements. However, we will inform the appropriate level of management of any material errors or any fraudulent financial reporting or misappropriation of assets that come to our attention. We will also inform the appropriate level of management of any violations of laws or governmental regulations that come to our attention, unless clearly inconsequential, and of any material abuse that comes to our attention. Our responsibility as auditors is limited to the period covered by our audit and does not extend to later periods for which we are not engaged as auditors.

Our procedures will include tests of documentary evidence supporting the transactions recorded in the accounts, and may include tests of the physical existence of inventories, and direct confirmation of receivables and certain other assets and liabilities by correspondence with selected individuals, funding sources, creditors, and financial institutions. We will request written representations from your attorneys as part of the engagement, and they may bill you for responding to this inquiry.

At the conclusion of our audit, we will require certain written representations from you about the financial statements; compliance with laws, regulations, contracts, and grant agreements; and other responsibilities required by generally accepted auditing standards.

Audit Procedures - Internal Controls

Our audit will include obtaining an understanding of the System and its environment, including internal control, sufficient to assess the risks of material misstatement of the financial statements and to design the nature, timing, and extent of further audit procedures. Tests of controls may be performed to test the effectiveness of certain controls that we consider relevant to preventing and detecting errors and fraud that are material to the financial statements and to preventing and detecting misstatements resulting from illegal acts and other noncompliance matters that have a direct and material effect on the financial statements. Our tests, if performed, will be less in scope than would be necessary to render an opinion on internal control and, accordingly, no opinion will be expressed in our report on internal control issued pursuant to *Government Auditing Standards.*

An audit is not designed to provide assurance on internal control or to identify significant deficiencies or material weaknesses. Accordingly, we will express no such opinion. However, during the audit, we will communicate to management and those charged with governance internal control related matters that are required to be communicated under AICPA professional standards and *Government Auditing Standards*.

Audit Procedures - Compliance

As part of obtaining reasonable assurance about whether the financial statements are free of material misstatement, we will perform tests of the System's compliance with applicable laws, regulations, contracts, agreements, and grants. However, the objective of those procedures will not be to provide an opinion on overall compliance and we will not express such an opinion in our report on compliance issued pursuant to *Government Auditing Standards*.

Management Responsibilities

Management is responsible for the financial statements and all accompanying information as well as all representations contained therein. Management is responsible for (1) designing, implementing, establishing and maintaining effective internal controls relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error, including evaluating and monitoring ongoing activities, to help ensure that appropriate goals and objectives are met; (2) following laws and regulations; and (3) ensuring that management is reliable and financial information is reliable and properly reported. Management is also responsible for implementing systems designed to achieve compliance with applicable laws, regulations, contracts, and grant agreements. You are also responsible for the selection and application of accounting principles, for the preparation and fair presentation of the financial statements in conformity with accounting principles generally accepted in the United States of America, and for compliance with applicable laws and regulations and the provisions of contracts and grant agreements.

Management is also responsible for making all financial records and related information available to us and for the accuracy and completeness of that information. You are also responsible for providing us with (1) access to all information for which you are aware that is relevant to the preparation and fair presentation of the financial statements, (2) access to personnel, accounts, books, records, supporting documentation, and other information as needed to perform an audit under *Government Auditing Standards*, (3) additional information that we may request for the purpose of the audit, and (4) unrestricted access to persons within the System from whom we determine it necessary to obtain audit evidence.

Management's responsibilities include adjusting the financial statements to correct material misstatements and for confirming to us in the representation letter that the effects of any uncorrected misstatements aggregated by us during the current engagement and pertaining to the latest period presented are immaterial, both individually and in the aggregate, to the financial statements taken as a whole.

Management is also responsible for the design and implementation of programs and controls to prevent and detect fraud, and for informing us about all known or suspected fraud or illegal acts affecting the System involving (1) management, (2) employees who have significant roles in internal control, and (3) others where the fraud or illegal acts could have a material effect on the financial statements. Your responsibilities include informing us of your knowledge of any allegations of fraud or suspected fraud affecting the System received in communications from employees, former employees, grantors, regulators, or others. Management is also responsible for taking timely and appropriate steps to remedy fraud and noncompliance with provisions of laws, regulations, contracts, and grant agreements, or abuse that we report. In addition, you are responsible for identifying and ensuring that the System complies with applicable laws, regulations, contracts, agreements and grants and for taking timely and appropriate steps to remedy any fraud, illegal acts, violations of contracts or grant agreements, or abuse that we may report.

Management is also responsible for the preparation of the supplementary information, which we have been engaged to report on, in conformity with accounting principles generally accepted in the United States of America. You agree to include our report on the supplementary information in any document that contains and indicates that we have reported on the supplementary information. You also agree to include the audited financial statements with any presentation of the supplementary information that includes our report thereon or to make the audited financial statements readily available to users of the supplementary information no later than the date the supplementary information is issued with our report thereon. Your responsibilities include acknowledging to us in a written representation letter that (1) you are responsible for presentation of supplementary information in accordance with GAAP; (2) you believe the supplementary information, including its form and content, is fairly presented in accordance with GAAP; (3) the methods of measurement or presentation have not changed from those used in the prior period (or, if they have changed, the reasons for such changes); and (4) you have disclosed to us any significant assumptions or interpretations underlying the measurement or presentation of supplementary information.

Management is responsible for establishing and maintaining a process for tracking the status of audit findings and recommendations. Management is also responsible for identifying and providing report copies of previous financial audits, attestation engagements, performance audits or studies related to the objectives discussed in the Audit Objectives section of this letter. This responsibility includes relaying to us corrective actions taken to address significant findings and recommendations resulting from those audits, attestation engagements, performance audits or studies. You are also responsible for providing management's views on our current findings, conclusions, and recommendations, as well as your planned corrective actions, for the report, and for the timing and format for providing that information.

With regard to the electronic dissemination of audited financial statements, including financial statements published electronically on your website, you understand that electronic sites are a means to distribute information and, therefore, we are not required to read the information contained in these sites or to consider the consistency of other information in the electronic site with the original document.

Planned Scope and Timing of the Audit

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve judgment about the number of transactions to be examined and the areas to be tested. Our tests will not include a detailed check of all transactions for the period.

Our audit will include obtaining an understanding of the entity and its environment, including internal control, sufficient to assess the risks of material misstatement of the financial statements and to design the nature, timing, and extent of further audit procedures. Material misstatements may result from (1) errors, (2) fraudulent financial reporting, (3) misappropriation of assets, or (4) violations of laws or governmental regulations that are attributable to the entity or to acts by management or employees acting on behalf of the entity. We will generally communicate our significant findings at the conclusion of the audit. However, some matters could be communicated sooner, particularly if significant difficulties are encountered during the audit where assistance is needed to overcome the difficulties or if the difficulties may lead to a modified opinion. We will also communicate any internal control related matters that are required to be communicated under professional standards.

We expect to begin our audit in May 2018 and conclude audit procedures and date our report in December 2018.

Use of Third-Party Service Providers

We maintain internal policies, procedures, and safeguards to protect the confidentiality of your information. We may, depending on the circumstances, use third-party service providers in providing our professional services. The following service providers may be utilized in the completion of our engagement:

- Capital Confirmation, Inc. – electronic bank and account balance confirmation service
- Wolters Kluwer – web-based application service to transfer files
- Harvest Investments, Ltd. – investment portfolio valuation service

You hereby consent and authorize us to use the above service providers, if deemed necessary, to complete the professional services outlined in this letter.

Engagement Administration, Fees and Other

We understand that your employees will prepare and provide us with the items listed in our request for audit information and will locate any documents selected by us for testing.

At the conclusion of the engagement, we will provide copies, which may include electronic copies, of the reports to System. It is management's responsibility to submit the reports to any other agencies that request or require the reports. Unless restricted by law or regulation, or containing privileged or confidential information, copies of our audit reports are to be made available for public inspection.

The audit documentation for this engagement is the property of Heinfeld, Meech & Co., P.C., and constitutes confidential information. However, we may be requested to make certain audit documentation available to a cognizant or oversight agency or its designee, a federal agency providing direct or indirect funding, the U.S. Government Accountability Office, or other authorized governmental agency for the purposes of a quality review of the audit, to resolve audit findings, or to carry out oversight responsibilities. If requested, access to such audit documentation will be provided under the supervision of Heinfeld, Meech & Co., P.C., personnel. Furthermore, upon request, we may provide copies of selected audit documentation to the aforementioned parties. These parties may intend, or decide, to distribute the copies or information contained therein to others, including other governmental agencies.

The audit documentation for this engagement will be retained for a minimum of five years after the report release or for any additional period requested by governmental agencies. If we are aware that a federal awarding agency, pass-through entity, or auditee is contesting an audit finding, we will contact the parties contesting the audit finding for guidance prior to destroying the audit documentation.

Corey Arvizu is the engagement partner and is responsible for supervising the engagement and signing the reports or authorizing another individual to sign them.

Our fee for these services will be at the amount outlined in our proposal. Our fee is based on anticipated cooperation from your personnel and the assumption that unexpected circumstances will not be encountered during the audit. We exercised care in estimating the fee and believe it accurately indicates the scope of the work. Our fee includes one exit meeting to discuss audit results and findings. Subsequent review of documentation and additional meetings will be billed at the hourly rates indicated below. Our fee does not include factors beyond our control, such as new GASB requirements, consultation and assistance in correcting errors in System-prepared information, or rescheduling of the audit when the System is not prepared.

It will be necessary for you to complete the requested information by certain timelines in order to meet the applicable filing deadlines for your audit reports. Not completing the requested information on time will jeopardize meeting the applicable filing deadlines. Additional fees incurred for factors beyond our control will be billed at the following hourly rates: Partner - $260; Manager - $190; Senior - $150; Staff - $105. Our invoices for these fees will be rendered each month as work progresses and are payable on presentation.

Government Auditing Standards require that we provide you with a copy of our most recent external peer review report and any letter of comment, and any subsequent peer review reports and letters of comment received during the period of the contract. Our 2015 peer review report accompanies this letter.

We appreciate the opportunity to be of service to Tucson Supplemental Retirement System and believe that this letter accurately summarizes the significant terms of our engagement. Please feel free to contact us at any time if you have questions or concerns. If you have any questions regarding this letter, please let us know. If you agree with the terms of our engagement as described in this letter, please sign the enclosed copy and return it to us.

Very truly yours,

Heinfeld, Meech & Co., P.C.

Heinfeld, Meech & Co., P.C.
Tucson, Arizona

cc: Pete Saxton, Finance Director

RESPONSE

This letter correctly sets forth the understanding of Tucson Supplemental Retirement System.

Printed Name: Pete Saxton

Title: Director of Business Services

Signature: Pete Saxton
Pete Saxton (May 30, 2018)

Date: May 30, 2018

M·U·N CPAs
MANN • URRUTIA • NELSON CPAs & ASSOCIATES, LLP
GLENDALE • ROSEVILLE • SACRAMENTO • SOUTH LAKE TAHOE • KAUAI, HAWAII

SYSTEM REVIEW REPORT

To the Partners of Heinfeld, Meech & Co., P.C.
and the Peer Review Committee of the
CalCPA Peer Review Program

We have reviewed the system of quality control for the accounting and auditing practice of Heinfeld, Meech & Co., P.C (the firm) in effect for the year ended May 31, 2015. Our peer review was conducted in accordance with the Standards for Performing and Reporting on Peer Reviews established by the Peer Review Board of the American Institute of Certified Public Accountants. As part of our review, we considered reviews by regulatory entities, if applicable, in determining the nature and extent of our procedures. The firm is responsible for designing a system of quality control and complying with it to provide the firm with reasonable assurance of performing and reporting in conformity with applicable professional standards in all material respects. Our responsibility is to express an opinion on the design of the system of quality control and the firm's compliance therewith based on our review. The nature, objectives, scope, limitations of, and the procedures performed in a System Review are described in the standards at www.aicpa.org/prsummary.

As required by the standards, engagements selected for review included engagements performed under *Government Auditing Standards* and audits of employee benefit plans.

In our opinion, the system of quality control for the accounting and auditing practice of Heinfeld, Meech & Co., P.C in effect for the year ended May 31, 2015, has been suitably designed and complied with to provide the firm with reasonable assurance of performing and reporting in conformity with applicable professional standards in all material respects. Firms can receive a rating of *pass, pass with deficiency(ies), or fail.* Heinfeld, Meech & Co., P.C has received a peer review rating of *pass.*

Mann Urrutia Nelson CPAs

Sacramento, California

August 6, 2015

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CITY OF
TUCSON
FINANCE DEPARTMENT
RETIREMENT OFFICE

Heinfeld, Meech & Co., P.C.
10120 N. Oracle Road
Tucson, AZ 85704

This representation letter is provided in connection with your audit of the financial statements of Tucson Supplemental Retirement System (System), which comprise the Statement of Fiduciary Net Position as of June 30, 2018, and the related Statement of Changes in Fiduciary Net Position, for the purpose of expressing an opinion as to whether the financial statements are presented fairly, in all material respects, in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP).

Certain representations in this letter are described as being limited to matters that are material. Items are considered material, regardless of size, if they involve an omission or misstatement of accounting information that, in light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would be changed or influenced by the omission or misstatement. An omission or misstatement that is monetarily small in amount could be considered material as a result of qualitative factors.

We confirm, to the best of our knowledge and belief, as of the date of our signature, the following representations made to you during your audit.

Financial Statements

1. We have fulfilled our responsibilities, as set out in the terms of the audit engagement letter, including our responsibility for the preparation and fair presentation of the financial statements in accordance with U.S. GAAP and for preparation of the supplementary information in accordance with the applicable criteria.

2. The financial statements referred to above are fairly presented in conformity with U.S. GAAP and include all other financial information of the System required by generally accepted accounting principles to be included in the financial reporting entity.

3. We acknowledge our responsibility for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

4. We acknowledge our responsibility for the design, implementation, and maintenance of internal control to prevent and detect fraud.

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5. Significant assumptions we used in making accounting estimates, including those measured at fair value, are reasonable.

6. Related party relationships and transactions, including revenues, expenditures/expenses, loans, transfers, leasing arrangements, and guarantees, and amounts receivable from or payable to related parties have been appropriately accounted for and disclosed in accordance with U.S. GAAP.

7. Adjustments or disclosures have been made for all events, including instances of noncompliance, subsequent to the date of the financial statements that would require adjustment to or disclosure in the financial statements.

8. The effects of all known actual or possible litigation, claims, and assessments have been evaluated, and if necessary, have been accounted for and disclosed in accordance with U.S. GAAP.

9. Guarantees, whether written or oral, under which the System is contingently liable, if any, have been properly recorded or disclosed.

Information Provided

10. We have provided you with:

    a. Access to all information, of which we are aware, that is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters and all audit or relevant monitoring reports, if any, received from funding sources.

    b. Additional information that you have requested from us for the purpose of the audit.

    c. Unrestricted access to persons within the System from whom you determined it necessary to obtain audit evidence.

    d. Minutes of the meetings of the Board of Trustees or summaries of actions of recent meetings for which minutes have not yet been prepared.

    e. Actuarial reports prepared for the plan, as applicable, during the year.

    f. Service auditor's reports prepared during the year for service organizations engaged by the System.

11. We have disclosed to you the results of our assessment of the risk that the financial statements may be materially misstated as a result of fraud.

12. We have no knowledge of any fraud or suspected fraud that affects the System and involves:
    - Management,
    - Employees who have significant roles in internal control, or
    - Others where the fraud could have a material effect on the financial statements.

13. We have no knowledge of any allegations of fraud or suspected fraud affecting the System's financial statements communicated by employees, former employees, grantors, regulators, or others.

14. We have no knowledge of any instances of noncompliance or suspected noncompliance with provisions of laws, regulations, contracts, or grant agreements, or abuse, whose effects should be considered when preparing financial statements.

15. We have disclosed to you all known actual or possible litigation, claims, and assessments whose effects should be considered when preparing the financial statements.

16. We have disclosed to you the identity of the System's related parties and all the related party relationships and transactions of which we are aware.

Plan-specific

17. There have been no communications from regulatory agencies concerning noncompliance with, or deficiencies in, financial reporting practices.

18. If applicable we have taken timely and appropriate steps to remedy fraud, noncompliance with provisions of laws, regulations, contracts, and grant agreements, or abuse that you have reported to us.

19. We have a process to track the status of audit findings and recommendations.

20. We have identified and communicated to you any previous audits, attestation engagements, and other studies related to the audit objectives and whether related recommendations have been implemented.

21. If applicable, we have provided our views on reported findings, conclusions, and recommendations, as well as our planned corrective actions, for the report.

22. The System has no plans or intentions that may materially affect the carrying value or classification of assets, liabilities, deferred outflows/inflows, and net position.

23. We are responsible for compliance with the laws, regulations, and provisions of contracts and grant agreements applicable to us.

24. We have identified and disclosed to you all instances that have occurred or are likely to have occurred, of fraud and noncompliance with provisions of laws and regulations that we believe have a material effect on the financial statements or other financial data significant to the audit objectives, and any other instances that warrant the attention of those charged with governance.

25. We have identified and disclosed to you all instances, which have occurred or are likely to have occurred, of noncompliance with provisions of contracts and grant agreements that we believe have a material effect on the determination of financial statement amounts or other financial data significant to the audit objectives.

26. We have identified and disclosed to you all instances that have occurred or are likely to have occurred, of abuse that could be quantitatively or qualitatively material to the financial statements or other financial data significant to the audit objectives.

27. There were no omissions from the participants' data provided to the System's actuary for the purpose of determining the actuarial accrued liabilities and other actuarially determined amounts in the financial statements.

28. The System agrees with the actuarial methods and assumptions used by the actuary for funding and financial reporting purposes, and for determining the System's actuarial accrued liabilities and net pension liabilities and has no knowledge or belief that such methods or assumptions are inappropriate in the circumstances.

29. The System agrees with the results of actuarial reports issued and have adequately considered the qualifications of the actuary in determining the amounts and disclosures used in the financial statements and underlying accounting records. We did not give or cause any instructions to be given to the actuary with respect to the values or amounts derived in an attempt to bias their work, and we are not otherwise aware of any matters that have had an impact on the independence or objectivity of the actuaries.

30. The methods and significant assumptions used to estimate fair values of financial instruments, including nonreadily marketable securities, result in a measure of fair value appropriate for financial measurement and disclosure purposes.

31. The methods and significant assumptions used to estimate fair values of financial instruments, including nonreadily marketable securities, result in a measure of fair value appropriate for financial measurement and disclosure purposes.

32. Financial instruments with concentrations of credit risk have been properly recorded or disclosed in the financial statements.

33. The System is qualified under the appropriate section of the Internal Revenue Code and we intend to continue as a qualified plan. The System has operated in a manner that did not jeopardize this tax status.

34. The System has satisfactory title to all owned assets, and there are no liens or encumbrances on such assets nor has any asset been pledged as collateral.

35. The System has complied with all aspects of contractual agreements that would have a material effect on the financial statements in the event of noncompliance.

36. Components of net position (Reserved for Employee Contributions and Reserved for Retirement Benefits) are properly classified and, if applicable, approved.

37. With regard to investments and other instruments reported at fair value:

- The underlying assumptions are reasonable and they appropriately reflect management's intent and ability to carry out its stated courses of action.
- The measurement methods and related assumptions used in determining fair value are appropriate in the circumstances and have been consistently applied.
- The disclosures related to fair values are complete, adequate, and in conformity with U.S. GAAP.
- There are no subsequent events that require adjustments to the fair value measurements and disclosures included in the financial statements.

38. If applicable, provisions for uncollectible receivables have been properly identified and recorded.

39. Additions and Deductions have been appropriately classified in or allocated in the Statement of Changes in Fiduciary Net Position, and allocations have been made on a reasonable basis.

40. Deposits and investment securities and derivative instruments are properly classified as to risk and are properly disclosed.

41. We have disclosed to you all significant estimates and material concentrations known to management that are required to be disclosed. Significant estimates are estimates at the balance sheet date that could change materially within the next year. Concentrations refer to volumes of business, revenues, available sources of supply, or markets or geographic areas for which events could occur that would significantly disrupt normal finances within the next year.

42. We have disclosed to you all significant estimates and material concentrations known to management that are required to be disclosed. Significant estimates are estimates at the balance sheet date that could change materially within the next year. Concentrations refer to volumes of business, revenues, available sources of supply, or markets or geographic areas for which events could occur that would significantly disrupt normal finances within the next year.

43. We acknowledge our responsibility for the required supplementary information (RSI). The RSI is measured and presented within prescribed guidelines and the methods of measurement and presentation have not changed from those used in the prior period. We have disclosed to you any significant assumptions and interpretations underlying the measurement and presentation of the RSI.

44. With respect to the supplementary information presented such as the Other Supplemental Information. We acknowledge our responsibility for presenting the supplementary information in accordance with accounting principles generally accepted in the United States of America, and we believe the supplementary information, including its form and content, is fairly presented in accordance with accounting principles generally accepted in the United States of America. The methods of measurement and presentation of the supplementary information have not changed from those used in the prior period, and we have disclosed to you any significant assumptions or

interpretations underlying the measurement and presentation of the supplementary information.

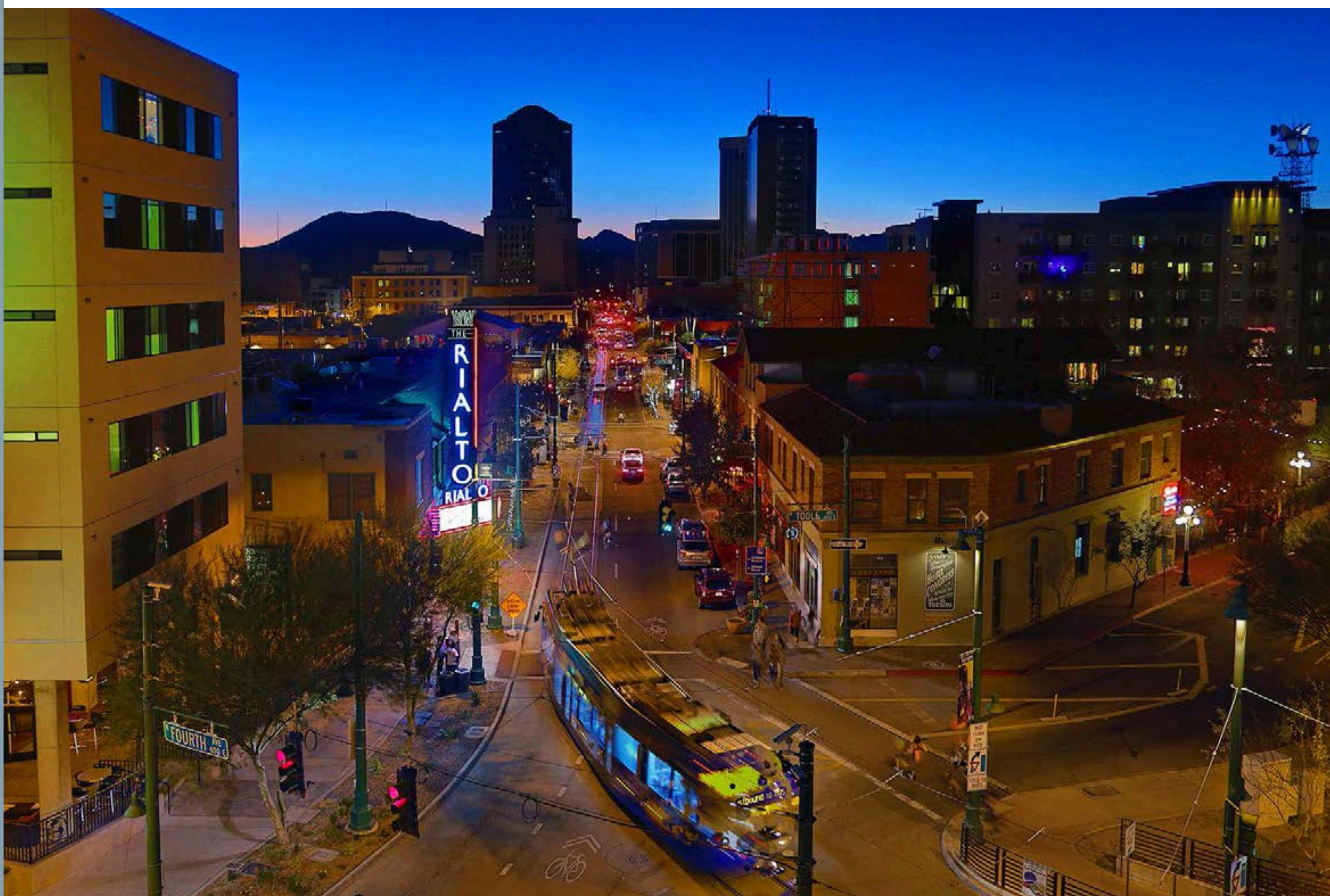
Art Cuaron, Pension and Benefits Administrator
City of Tucson

12/20/18
Date

City of Tucson, Arizona

TUCSON SUPPLEMENTAL RETIREMENT SYSTEM

A Component of the City of Tucson



Comprehensive Annual Financial Report
Fiscal Year July 1, 2017 - June 30, 2018

TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
(A Component Unit of the City of Tucson, Arizona)

Comprehensive Annual Financial Report
For Fiscal Year Ended
JUNE 30, 2018

Issued by the City of Tucson, Retirement Division

CITY OF

FOUNDED

1775

TUCSON

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CITY OF TUCSON, ARIZONA

Introductory

Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Tucson Supplemental Retirement System

Arizona

For its Comprehensive Annual Financial Report for the Fiscal Year Ended

June 30, 2017

Christopher P. Morrill

Executive Director/CEO

CITY OF TUCSON

December 30, 2018

To the Chairman and Members of the Retirement Board,
Tucson Supplemental Retirement System

The Comprehensive Annual Financial Report (CAFR) of the Tucson Supplemental Retirement System ("TSRS" or the "System") for the year ended June 30, 2018, is herewith submitted. Responsibility for both the accuracy of the data and the completeness and fairness of the presentation rests with the management of TSRS. A narrative introduction to financial statement highlights, overview and analysis for fiscal year 2018 can be found in the Management's Discussion and Analysis beginning on page 3 of the Financial Section.

The Tucson Supplemental Retirement System was established in 1953 to provide a monthly retirement supplement to social security benefits and to the personal retirement savings of its members. The benefits provided to members are supported by payroll contributions made by active members, City contributions and investment returns from the retirement system asset portfolio.

For the fifth consecutive year, the System's funded status improved, rising from 74.1% to 76.2% for the year ended June 30, 2018. The increase is primarily due to asset gains on the smoothed or actuarial value of assets, as well as contributions in excess of the actuarial determined contribution.

The TSRS Board of Trustees (the "Board") has recommended changes during the past several years specifically aimed at improving the financial sustainability of the System. In 2006, the Board initiated variable contribution rates for employees hired after June 30, 2006. In 2011, the Board implemented a reduced cost Tier II plan design for all new employees hired after June 30, 2011. In 2013, the Board adopted a funding policy that changed the amortization period from 15 to 20 years. In 2014, the Board added a rounding policy designed to pay-off the unfunded liability sooner, and reduced the assumed investment rate of return from 7.75% to 7.25%.

Record keeping is the responsibility of the Human Resource Department, Employee Benefits and Retirement Section. Preparation of financial statements and control over investment responsibilities for TSRS are performed by Retirement staff in conjunction with the City's Financial Operations. TSRS uses the accrual basis of accounting. This CAFR was prepared in conformance with principles of governmental accounting and reporting set forth by the Governmental Accounting Standards Board (GASB). Internal control is the responsibility of management, with an objective that they are responsible for an accounting of their stewardship of the resources entrusted to their care. Internal accounting controls provide reasonable, but not absolute, assurance that the financial statements are free of any material misstatements because the cost of a control should not exceed the benefits to be derived, the objective is to provide reasonable, rather than absolute assurance the financial statements are free of any material misstatement.

Annually, the budget for the System must be approved by the Board. The budget is also included in the City of Tucson annual budget which is recommended by the City Manager for adoption by the Mayor and Council.

Provisions of the Tucson City Code require unanimous approval of all System expenses by the Board. The Board reviews the TSRS expenses and ratifies all retirements at their monthly meetings.

Contributions to the System are based on principles of level-cost financing with current service financed as a level percent of payroll on a current basis and prior service amortized as a level percent of payroll over a fixed period of twenty years beginning July 1, 2014.

Funding Status

Analysis of the funding progress for TSRS measures the net assets available for benefits against the actuarial accrued liability, in order to arrive at the System's percent funded ratio. As of June 30, 2018, the System's funded ratio increased from 74.1% to a 76.2% funded level on an actuarial basis. On a market basis, the System's funded ratio increased from 76.2% to 78.8%. The actuarial accrued liability increased from $1,036.7M to $1,054.0M an increase of 1.67%. The actuarial value of assets allocated to funding and available for benefits increased by 4.62%, from $767,988,402 to $803,439,269. The unfunded actuarial accrued liability decreased by $18,151,160 or 7.24% in the current year. The System experienced an asset gain of $16.3 million during fiscal year 2018. The market value of assets returned greater than 7.25% during the year; thereby creating the observed gains. The changes in accrued actuarial liability are primarily due to salary increases less than expected.

Investment Activities

Net investment income amounted to $69,697,588. The net investment income or loss is comprised of bond interest, dividend income, real estate income, security lending income, investment expenses and realized and unrealized gains and losses on securities. The rate of return, on a money-weighted basis, for the total fund for the year was 9.88% (gross of fees). For the last three and five years, the System had annualized returns of 8.87% and 10.07%, respectively.

TSRS asset allocation targets are 34% U.S. equities, 25% foreign equities, 9% real estate, 27% fixed income and 5% infrastructure. These percentages reflect the current diversification posture as of June 30, 2018 and represent the Board's prudent judgment in the pursuit of maximum returns at acceptable levels of risk.

In accordance with current investment policy, the System's asset classes were rebalanced throughout the fiscal year. Due to ongoing liquidity requirements needed to pay retiree pensions, $34.0 million was moved out of various asset classes, in monthly increments, to the City's investment pool account. This amount was utilized throughout the fiscal year to make up the shortfall between pension contributions and distributions. This movement of funds had a "self-balancing" effect between equities, fixed income, real estate and infrastructure which helped to keep those asset classes within their current target allocation percentage ranges.

Professional Services

The Retirement Board retains money managers and other professionals to prudently discharge its fiduciary responsibility for the proper administration of the System. Opinions of the independent auditors and the actuary are included in this report. The professionals retained by the Board are listed on page vi of this report.

Acknowledgments

This report is intended to provide information as a means for making management decisions, complying with statutory provisions, and demonstrating responsible stewardship for assets of the System. The preparation of this report reflects the combined efforts of TSRS staff, the City of Tucson Business Services Department, and others that have worked diligently to assure the successful operation of TSRS. Special words of appreciation are due to: Karen Tenace, Deputy Finance Director, Bob Szelewski, Lead Pension Analyst, Dawn Davis, Management Analyst, Jamie Leon-Guerrero, Administrative Assistant, Silvia Navarro, Treasury Administrator, Aaron Williams, Finance Manager and David Roels, Principal Accountant. The direction and support extended by the Board of Trustees is also greatly appreciated.

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the Tucson Supplemental Retirement System for its comprehensive annual financial report for the fiscal year ended June 30, 2017. This was the 22nd consecutive year that the Tucson Supplemental Retirement System has achieved this prestigious award. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized comprehensive annual financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements.

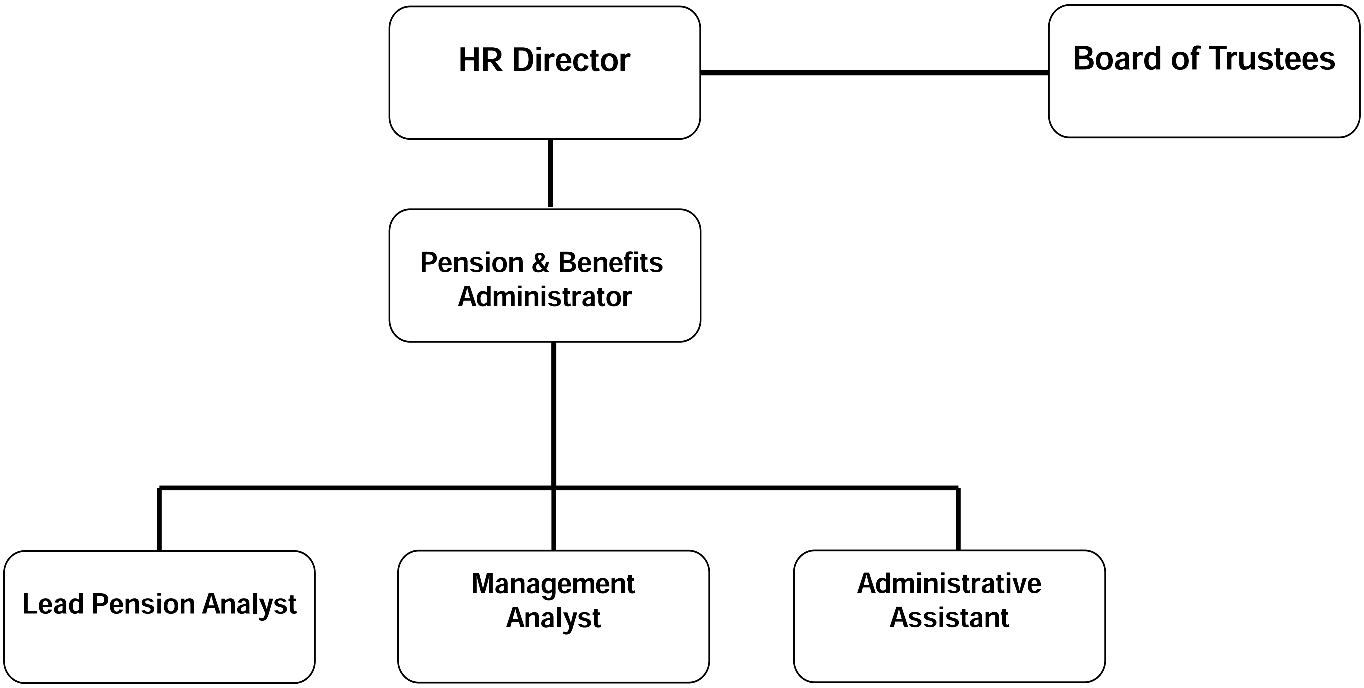
A Certificate of Achievement is valid for a period of one year only. We believe that our current comprehensive annual financial report continues to meet the Certificate of Achievement Program's requirements and we are submitting it to the GFOA to determine its eligibility for another certificate.

Respectfully submitted,

Art Cuaron

Art Cuaron, MBA
Pension & Benefits Administrator
Tucson Supplemental Retirement System

Organization Chart



Administrative Organization

BOARD OF TRUSTEES
Robert Fleming
Chairman

Kevin Larson
City Manager's Appointee

Pete Saxton
Finance Director

Ana Urquijo
Human Resource Director

Jorge Hernández
Employee Representative

Michael Coffey
Employee Representative

Jim Wysocki
Retiree Representative

FINANCE DEPARTMENT
Karen Tenace, Deputy Director

TREASURY DIVISION STAFF
Silvia Navarro
Treasury Administrator

Lisa Lopez
Finance Manager

RETIREMENT STAFF
Art Cuaron, MBA
Pension & Benefits Administrator

Bob Szelewski
Lead Pension Analyst

Dawn Davis
Management Analyst

Jamie-Leon Guerrero
Administrative Assistant

ACCOUNTING
David Roels
Principal Accountant

LEGAL
David Deibel
Principal Assistant City Attorney

External Counsel
Yoder & Langford, P.C.
Phoenix, AZ

ACTUARY
Gabriel, Roeder, Smith & Company
Denver, CO

AUDITOR
HeinfeldMeech
Tucson, AZ

INVESTMENT MANAGERS*
Aberdeen Asset Management
Philadelphia, PA

Alliance Capital Management Corporation
New York, NY

American Century Investments
Kansas City, MO

BlackRock Institutional Trust Company, N.A.
San Francisco, CA

Causeway Capital Management
Los Angeles, CA

Fidelity Investments
Smithfield, RI

JP Morgan Asset Management
San Francisco, CA

Pacific Investment Management Company
Newport Beach, CA

Champlain Investment Partners
Burlington, VT

Macquarie Capital (USA), Inc.
New York, NY

SteelRiver Infrastructure
New York, NY

T. Rowe Price Associates
Baltimore, MD

INVESTMENT CONSULTANT
Callan Associates, Inc.
San Francisco, CA

CUSTODIAN BANK
BNY Mellon – New York, NY

*Fee schedule for investment managers can be found on page 43 of this report.

CITY OF

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TUCSON

CITY OF TUCSON, ARIZONA

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INDEPENDENT AUDITOR'S REPORT

Board of Trustees
Tucson Supplemental Retirement System

Report on the Financial Statements

We have audited the financial statements of the Tucson Supplemental Retirement System (System), a pension fund of the City of Tucson, Arizona, which comprise the Statement of Fiduciary Net Position as of June 30, 2018, and the related Statement of Changes in Fiduciary Net Position for the year then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the net position of the Tucson Supplemental Retirement System as of June 30, 2018, and the respective changes in net position, for the year then ended in accordance with accounting principles generally accepted in

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis and the Required Supplementary Information, as listed in the table of contents, be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the System's financial statements. The Introductory Section, Other Supplemental Information, Investment Section, Actuarial Section, and Statistical Section, as listed in the table of contents, are presented for purposes of additional analysis and are not a required part of the financial statements.

The Other Supplemental Information, as listed in the table of contents under the Financial Section, is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. Such information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Other Supplemental Information is fairly stated, in all material respects, in relation to the financial statements as a whole.

The Introductory Section, Investment Section, Actuarial Section, and Statistical Section have not been subjected to the auditing procedures applied in the audit of the financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated December 28, 2018, on our consideration of the Tucson Supplemental Retirement System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Tucson Supplemental Retirement System's internal control over financial reporting and compliance.

Heinfeld, Meech & Co., P.C.

Heinfeld, Meech & Co., P.C.
Tucson, Arizona
December 28, 2018

MANAGEMENT'S DISCUSSION AND ANALYSIS

We are pleased to provide this overview and analysis of the financial activities of the Tucson Supplemental Retirement System (TSRS) for the plan year ended June 30, 2018. We encourage readers to consider the information presented here in conjunction with additional information that we have furnished in our Letter of Transmittal, which begins on page ii of this report.

Financial Highlights

- The net position of TSRS as of the close of the plan year ended June 30, 2018 was $823,633,518 (net position restricted for pensions). The net position is available to meet TSRS's ongoing obligations to plan participants and their beneficiaries.

- TSRS's increase in total net position restricted for pension benefits was $33,690,581. The increase of 4.3% over the prior year was primarily a result of investment income.

- TSRS's funding objective is to establish and receive contributions, which will remain approximately level from year to year and thereby minimize inter-generational cost transfers. As of June 30, 2018, the date of our last actuarial valuation, the funded ratio for TSRS was 76.2% on an actuarial basis, 78.1% using the market value basis.

- Revenues (Additions to Plan Net Position) for the year were $110,054,532, which includes member and employer contributions plus transfers from other systems and contributions from other sources totaling $40,356,944, investment earnings income and securities lending income and expense of $13,043,184 and a net gain in fair value of investments of $65,251,196 reduced by investment expenses of $8,596,792.

- Expenses (Deductions from Plan Net Position) increased from $73,970,326 in the prior year to $76,363,951 or approximately 3.2%. The net increase in deductions resulted from two sources: one, an increase in pension benefits paid, and two, an increase of refunds issued in the amount of $1,386,702. The increase in benefits is a result of having more retirees; there were 2,974 at June 30, 2017 and 3,031 at June 30, 2018. The increase in refunds issued is a result of more individuals refunding their accounts upon separation.

Overview of the Financial Statements

The following discussion and analysis is intended to serve as an introduction to TSRS's financial statements, which are comprised of these components:

1. Statement of Fiduciary Net Position
2. Statement of Changes in Fiduciary Net Position
3. Notes to the Financial Statements

Please note that this report also contains other supplementary information in addition to the basic financial statements themselves, including details of the system's investments, actuarial analysis, and various statistical information found in sections under those names.

The Statement of Fiduciary Net Position is a snapshot of account balances at year-end. It indicates the assets available for future payments to retirees and any current liabilities that are owed at this time.

The Statement of Changes in Fiduciary Net Position, on the other hand, provides a view of current year additions to and deductions from the plan.

Both statements comply with applicable Governmental Accounting Standards Board (GASB) Statements. These pronouncements require certain disclosures and require state and local governments to report using the full accrual method of accounting. TSRS complies with all material requirements of these pronouncements.

The Statement of Fiduciary Net Position and the Statement of Changes in Fiduciary Net Position report information about TSRS's activities. These statements include all assets, deferred outflows, liabilities and deferred inflows, using the full accrual basis of accounting, which is similar to the accounting used by most private-sector companies. All of the current year's revenues and expenses were taken into account regardless of when cash is received or paid. All investment gains and losses are shown at trade date, not settlement date. In addition, both realized and unrealized gains and losses are shown on investments, and all capital assets (fixed assets) are depreciated over their useful lives.

TSRS's net position restricted for pensions is displayed on the Statement of Fiduciary Net Position as the difference between assets and liabilities. Over time, increases and decreases in TSRS's net position is one indicator of whether its financial condition is improving or deteriorating. (See TSRS's financial statements on pages 8 and 9 of this report).

Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the financial statements. (See Notes to Financial Statements on pages 10-24 of this report).

The Required Supplementary Information that follows immediately after the notes to financial statements provides new information and schedules due to the GASB 67 implementation in fiscal year 2014. These schedules started with one year as of June 30, 2014, but eventually will build up to ten years of information.

Financial Analysis

As previously noted, net position may serve over time as a useful indication of TSRS's financial position (see table on page 5). The total assets of TSRS exceeded its liabilities at the close of the plan year ended June 30, 2018 with $823,633,518 in net position held in trust for payment of ongoing obligations to plan participants and their beneficiaries.

Net Position of the Plan

Assets	June 30, 2017	June 30, 2018	Change
Cash, cash equivalents, and receivables	$ 5,066,161	$ 3,352,975	-33.8%
Investments	788,228,746	821,882,684	4.3%
Securities lending cash collateral	28,692,389	35,243,677	22.8%
Total assets	821,987,296	860,479,336	4.7%
Liabilities			
Accounts payable and other payables	173,674	454,720	161.8%
Due to securities lending borrowers	28,692,389	35,243,677	22.8%
Due to brokers	3,178,296	1,147,421	-63.9%
Total liabilities	32,044,359	36,845,818	15.0%
Total net position	$ 789,942,937	$ 823,633,518	4.3%

At June 30, 2018, the Total net position restricted for pension of $823,633,518 was available for payment of pension benefits, as shown in the Statement of Plan Position on page 8. This amount represents an increase of 4.3% from June 30, 2017.

Additions to Plan Net Position

	June 30, 2017	June 30, 2018	Change
Employer contributions	$ 31,823,694	$ 31,795,197	-0.1%
Employee contributions	7,439,065	8,561,747	15.1%
Net gain (loss) in fair value of investments	89,165,007	56,654,404	-36.5%
Investments and securities lending income (net)	8,702,618	13,043,184	49.9%
Total additions	$ 137,130,384	$ 110,054,532	-19.7%

Employer contributions decreased by $28,497; or 0.1%, and employee contributions increased by $1,122,682, or 15.1%. Net gain in Fair Value of Investments decreased by $32,510,603, or 36.5% compared to the prior year. This indicates that personnel activities are stable, while the investment returns have declined compared to the prior year. It is important to note the return is above the 7.25% expected value, and the total returns for multiple years can be seen on page 26. Finally, income from investment and securities lending increased for the current year by $4,340,566 or 49.9%. This change is primarily because the income from securities lending is now reported with a focus on gross cash flows. The System now reports carried interest in the form of higher additions, offset by expenses in a similar amount. The total amount of carried interest expense can be seen on page 43 of this report.

Deductions from Plan Net Position

The principal purpose for which the System was created was to provide supplemental retirement annuities, survivor benefits, and total and permanent disability benefits to qualified members and their beneficiaries. The costs of such programs include recurring benefit payments as required by the plan design, refunds of contributions to terminated employees, the cost of administering the System and expenses incurred in the investment of the Systems assets.

Total deductions for fiscal year 2018 were $76,363,951 representing an increase of 3.2% from fiscal year 2017 deductions. An increase in the payment of retirement benefits of $1,386,702 was the largest factor contributing to the increase in deductions. An increase in the payment of refunds and transfers to other plans was only slightly less significant at $1,018,339.

Deductions from Plan Net Position

	June 30, 2017	June 30, 2018	Change
Payments to participants	71,059,090	72,445,792	2.0%
Refunds and transfers to other plans	2,154,067	3,172,406	47.3%
Administrative expense	756,268	745,753	-1.4%
Miscellaneous deductions	901	-	-100.0%
Total deductions	73,970,326	76,363,951	3.2%

Reserves

Within net position, the System internally places an amount into a separate reserve for employee contributions for all amounts contributed by members. Deductions are made from this account when the member retires, transfers balances to other retirement systems, or when a member terminates employment and requests a refund. As of the plan year ended June 30, 2018, the balance in this reserve account increased by $4,503,342 to $138,420,705.

Upon retirement, the system places an amount in reserves for retirement benefits equivalent to the present value of the actuarial benefit selected by the member. When the present value is determined, amounts are added to this reserve from amounts in the reserve for employee contributions and from the unreserved net position balance to fully fund the expected liability. As a result of the change in market value of the system assets, the reserve increased for the plan year ended June 30, 2018 by $10,255,289 to $716,751,118.

The impact of gains or losses recognized during the plan year ended June 30, 2018 affects the amount remaining in the unreserved net position. Employer funding is added to the unreserved net position balance. At retirement, amounts needed to fully fund retirement benefits are transferred from the unreserved net position to the reserves for retirement benefits. As a result of the change in market values of the system's assets, the unreserved net position increased by $18,931,950 to a negative ending balance of $31,538,305.

TSRS's Fiduciary Responsibilities

TSRS's Board of Trustees and management staff are fiduciaries of the pension trust fund. Under the City of Tucson Code the assets can only be used for the benefit of plan participants and their beneficiaries.

Requests for Information

This financial report is designed to provide the Retirement Board of Trustees, our membership, taxpayers, investment managers and other interested parties with a general overview of TSRS's finances and to account for the money it receives. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to:

Tucson Supplemental Retirement System
Attention: TSRS Pension Administrator
City Hall, 3rd floor
255 West Alameda Street
Tucson, Arizona 85701
(520) 791-4598

Tucson Supplemental Retirement System
Statement of Fiduciary Net Position
June 30, 2018

Assets:		
Interest & Dividends Receivable	$	2,025,147
Due from Brokers		1,327,828
Short Term Investments		21,825,206
Securities Lending Cash Collateral		35,243,677
U.S. Treasuries, Agencies & Other Governmental Bonds		104,795,239
Bonds and Preferred Stock		49,818,739
U.S. Equities		280,855,925
International Bonds & Other Fixed Income Instruments		38,165,576
International Equity & Commingled Equity Funds		214,019,103
Real Estate & Commingled Real Estate Funds		77,026,533
Infrastructure Investment Funds		35,376,363
Total Assets:		860,479,336
Liabilities:		
Accounts Payable		211,362
Accrued Payroll Liabilities		6,731
Due to Other Funds		236,627
Due to Securities Borrowers		35,243,677
Due to Brokers		1,147,421
Total Liabilities:		36,845,818
Net Position:		
Restricted for Pensions	$	823,633,518

See accompanying notes to financial statements

Tucson Supplemental Retirement System
Statement of Changes in Fiduciary Net Position
Year Ended June 30, 2018

Additions:	
Employer Contributions	$ 31,795,197
Employee Contributions	8,561,747
Net Increase (Decrease) in Fair Value of Investments	65,251,196
Interest, Dividends and Other Income	12,847,813
Securities Lending Income	136,768
Less: Investment Activity Expense	(8,596,792)
Less: Securities Lending Expense	(54,675)
Miscellaneous Additions	113,278
Total additions:	$ 110,054,532
Deductions:	
Payments to Participants	72,445,792
Refunds and Transfers to Other Plans	3,172,406
Administrative Expense	745,753
Total deductions:	76,363,951
Changes in net position:	33,690,581
Net position, beginning of year	789,942,937
Net position, end of year	$ 823,633,518

See accompanying notes to financial statements

Tucson Supplemental Retirement System
Notes to Financial Statements
Year Ended June 30, 2018

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES AND DISCUSSION OF PLAN NET POSITION

A. Reporting Entity – The Tucson Supplemental Retirement System (the System) is a single-employer defined benefit plan established by the City and administered by a seven-member Board of Trustees. Although the system is a separate legal entity, its sole purpose is to provide services exclusively for the benefit of the City; therefore, it is included as a blended component unit of the City, identified as the Pension Trust Fund in the City's Comprehensive Annual Financial Report.

B. Basis of Accounting - The System's financial statements are prepared using the accrual basis of accounting and economic resources measurement focus. Employee and employer contributions are recognized when due, pursuant to formal commitments. Benefits and refunds are recognized when due and payable in accordance with the plan provisions.

C. Investments - Investments are reported at fair value. Securities traded on a national or international exchange are valued at the last reported sales price at current exchange rates. The fair value of real estate investments is based on independent appraisals. Investments that do not have an established market are reported at estimated fair value, which is determined by the System custodian in consultation with the System's investment managers.

The cost of common stock sold is determined on the average cost method. Realized and unrealized gains or losses are reflected in revenues.

D. Cash and Cash Equivalents – Amounts reported as cash and cash equivalents represent the System's proportionate share of the City's Investment Pool Account.

E. Deposits - In accordance with the City Charter and state statutes, the System is authorized to deposit money in certificates of deposit and interest-bearing accounts provided that deposits in excess of the insured amount are collateralized. State statutes require collateral pledged for deposits to be held in the System's name by a bank other than the pledging bank or by the pledging bank's trust department.

F. Capital Assets – Capital assets of the System currently include moveable equipment items and the capitalized cost of pension administration software, stated at historical cost net of accumulated depreciation. The straight-line method of depreciation for capitalized equipment and software is used over an estimated useful life of 6 years. The capitalization threshold is $5,000. The capital assets were fully depreciated as of June 30, 2018.

G. Administrative Costs - All costs of administering the plan are financed by the employer and member contributions made, based upon recommended contribution rates in effect for the year, applied on active member covered payroll.

H. Net Pension Liability – The components of the net pension liability as of June 30, 2018 are as follows:

Total Pension Liability	$	1,053,987,024
Plan's Fiduciary Net Position		823,633,518
Net Pension Liability		230,353,506
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		78.14%
Covered Employee Payroll	$	118,152,118
Net Pension Liability as a Percentage of Covered Employee Payroll		194.96%

I. Tax Status of the Plan – The System applied for an IRS determination letter in January 2015, and received a favorable determination (qualified status) from the IRS on January 11, 2017.

2. DESCRIPTION OF THE PLAN

A. *Authorization, Purpose, and Administration of the System* - The Tucson Supplemental Retirement System (the "System" or "TSRS") is a single-employer defined benefit plan for City of Tucson, Arizona ("City") employees. It was established in the City Charter to provide its members with a supplement to the retirement and disability benefits of the social security system. The System is governed by a seven member Board of Trustees: a chairman who is appointed by the Mayor and Council, the City's directors of human resources and of finance, two members elected by the membership of the System, a retired member elected by the System's retirees, and one member appointed by the City Manager. Benefit provisions and changes in benefits or funding are recommended by the Board of Trustees and must be approved by Mayor and Council.

B. *Plan Membership* - The System covers substantially all City of Tucson, Arizona, employees, except for appointed officials and staff who may elect not to join, commissioned police and fire personnel, and elected officials, who are covered under other plans. Employees participate in the System immediately upon beginning employment with the City. Employee membership data as of June 30, 2018 is as follows:

Membership – number of:	
Retirees and Beneficiaries	3,031
Inactive, Non-retired Members (90 non vested)	402
Active plan participants	2,455
Total Membership	5,888

C. *Plan Benefits*

1. *Retirement Benefits*:

Tier I benefit plan: Any employee hired prior to July 1, 2011, who has attained the earlier of age 62, or a combination of the employee's age and years of creditable service equaling the sum of 80, is entitled to receive monthly retirement benefits calculated at 2.25% of average final monthly compensation multiplied by the number of years of creditable service. Employees hired after July 1, 2009 receive the same benefit, but are required to have a minimum of five years accrued service. Average final monthly compensation is defined as the highest compensation of 36 consecutive months during the 120 months immediately preceding retirement. Accrued unused sick leave and vacation leave at the final salary is included in the member's service period and is substituted for an equal number of hours at the beginning of the 36 month period for determining the average final salary calculation.

Tier II benefit plan: Any employee hired after June 30, 2011, who has attained the minimum retirement age of age 60, and who also has a combination of employee age and years of service equaling the sum of 85, is entitled to receive monthly retirement benefits calculated at 2.00% of average final monthly compensation multiplied by the number of years of creditable service. Average final monthly compensation is defined as the highest compensation of 60 consecutive months during the 120 months immediately preceding retirement. Accrued unused sick leave and vacation leave at the final salary is not included for member service credits or as a substitution for an equal number of hours at the beginning of the 60 month period final average salary calculation.

An employee who retires after attaining age 55 with 20 or more years of creditable service under Tier I; or after attaining age 60 with 20 or more years of credited service under Tier II, is entitled to early retirement benefits reduced to the actuarial equivalent of the amount to which the employee would have been entitled upon attaining normal retirement.

An employee is always fully vested in his/her individual contributions. Upon termination of employment for reasons other than retirement, employees having five or more years of creditable service (terminated vested participants) may leave their contributions in the System as a deferred retirement, and begin drawing a retirement allowance when they reach either their normal or early retirement eligibility date.

2. *Disability Benefits* - Employees with ten or more years of accrued service, who are not yet eligible to retire and who have a total and permanent disability may apply for disability retirement.

3. *Death Benefits* - The beneficiary of an employee who pre-selected a retirement option and died while eligible to retire, shall receive a benefit based upon the selected option if the member has made such an election by June 30, 2009.

The spousal beneficiary of an employee who died while eligible to receive benefits but who had not pre-selected a benefit option by June 30, 2009, may choose to receive a benefit equal to a 100% joint and survivor annuity based on the member's years of credited service and average final monthly compensation at the time of the member's death, or may elect to receive a lump sum payment of twice the members account balance plus interest, measured on the date of death.

The named beneficiary of an employee who is other than the spouse of the employee who died while eligible to receive benefits but who had not pre-selected a benefit option by June 30, 2009, may choose to receive a benefit equal to a 15 year term certain benefit to the named beneficiary, or the beneficiary may elect to receive a lump sum payment of twice the members account balance plus interest, measured on the date of death.

Multiple designated beneficiaries of an employee who died while eligible to receive benefits but who had not pre-selected a benefit option by June 30, 2009, receive a lump sum payment of twice the member's account balance plus interest, measured on the date of death.

The beneficiary of an employee who was not eligible for any retirement benefits, but had more than five years of creditable service, may receive a lump sum payment of twice the member account balance plus interest, measured on the date of death.

3. CONTRIBUTIONS AND RESERVES

A. Funding Requirements

1. *Employee Contributions* - Employee contributions are 5% of active member covered payroll for employees hired prior to July 1, 2006. Employees hired after June 30, 2006 are contributing an amount equal to 40% of the actuarially required contribution rate determined annually by the system Actuary. For the fiscal year ended June 30, 2018, the employee blended contribution rate was 5.15%. All member contributions are made by payroll deductions applied to regular pay, based on the approved contribution rates established by the system Actuary, applied as a percent of payroll.

Effective July 1, 2013, the funding policy changed for employees hired after June 30, 2006; requiring a contribution rate that is equal to a range of between 50% and 100% of the normal cost of the members benefit Tier. For Tier I members (hired between July 1, 2006 and June 30, 2011), the contribution rate for fiscal year 2018 was 6.75%. For Tier II members (hired after July 1, 2011), the contribution rate for fiscal year 2018 was 5.25%. A reserve is established for contributions and earnings allocations, less amounts transferred to the reserve for retirement benefits which includes retirement and disability and amounts reserved for terminated employees. If an employee leaves covered employment before attaining five years of service credit, the accumulated contributions plus interest are refunded to the employee or his designated beneficiary. There are no long-term contracts for employee contributions to the plan, and all contributions are made on a bi-weekly basis.

2. *Employer Contributions* – Employer contributions are based on the annual required contribution rate determined by the Actuary, and are equal to the difference between the recommended total contribution rate and the employee rates, based on a level percentage of payroll method. The contribution rate is determined by the actuary at a level necessary to finance employee participation in the System and to fund the costs of administering the System. The annual rate determined by the Actuary is recommended to the Board of Trustees and considered for approval and adoption by Mayor and Council. There are no long-term contracts for employer contributions to the plan, and all contributions are made on a bi-weekly basis.

B. Net Position

Two general types of net position reserves are maintained within the System. The Reserve for Employee Contributions contains the employee contributions for all contributing members of the System, plus allocated interest earnings. At the time an employee retires or defers retirement, the actuarial value of the individual's retirement benefits is transferred to the Reserve for Retirement Benefits, which is decreased by payments to retirees and increased by interest earnings. The reserves for employee contributions and retirement benefits are fully funded.

Earnings of the System are allocated semi-annually (at June 30 and December 31) to the reserves which comprise net position. For the year ended June 30, 2018, allocations were based on rates of return of 3.00% per annum. Any unallocated earnings remain in unreserved net position.

The net position at June 30, 2018, consisted of the following components:

Reserved for employee contributions	$ 138,420,705
Reserved for retirement benefits	716,751,118
Unreserved net position (deficit)	(31,538,305)
Net Position	$ 823,633,518

4. INVESTMENTS

The System is governed by a Board of Trustees. The Board of Trustees is required by City Code, in making investment decisions, to exercise the judgment and care under the circumstances then prevailing which persons of ordinary prudence, discretion and intelligence exercise in management of their own affairs, not in regard to speculation, but in regard to the permanent disposition of their funds, considering the probable income there from, as well as the probable safety of the capital. Investments of the System are held and managed by investment professionals separately from those of other City funds. Quoted market prices have been used to value investments as of June 30, 2018.

For those investments that do not have established market exchanges, the fair value is estimated as objectively as possible by third party appraisals. Real Estate and Infrastructure investment managers utilize third party appraisals to determine fair value of assets under investment. Infrastructure investments pertain to forms of "real" property used for general public purposes that typically involve partnerships between governmental and private entities. Examples of infrastructure investments are toll roads, bridges, pipelines, airports, shipping ports, etc. The System currently participates in two pooled infrastructure funds as well as two real estate funds.

The System's investments at June 30, 2018 are listed below. These investments are either held by the System or its agent in the System's name and are insured, registered or collateralized. A portion of these investments are subject to credit risk (including custodial credit risk and concentrations of credit risk), interest rate risk and/or foreign currency risk. The Government Accounting Standards Board (GASB) Statement No. 40 requires the System to disclose such risks which are all discussed in the sections that follow.

All System investments are reflected in the following schedule at fair value net of accruals with the exception of amounts held in the City's investment pool account. The City maintains an investment pool account for City funds. Bi-weekly contributions for the Tucson Supplemental Retirement System are held in the City's investment pool account and are used to pay recurring expenditures. At June 30, 2018, the system had no cash in the City investment pool account. The System's investment in the City's investment pool would represent a proportionate interest in the pool's portfolio; however, the System's portion is not identified with specific investments and is not subject to custodial credit risk.

The System categorizes its fair value measurements within the fair value hierarchy established by Generally Accepted Accounting Principles. The hierarchy is based on the valuation inputs used to measure the fair value of assets. The fair value hierarchy, which as three levels, is based on the valuation inputs used to measure an asset's fair value: Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs. The System has the following recurring fair value measurements as of June 30, 2018:

Investments	**Fair Value**	**Level 1**	**Level 2**	**Level 3**
U.S. Issues not on Securities Loan:				
U.S. Treasuries, Agencies, Governmental Bonds & Comingled U.S. Debt	$ 104,795,239	1,282,969	-	103,512,270
Corporate Bonds & Other Fixed Income Instruments	49,269,099	-	43,934,675	5,334,424
U.S. Equity & Commingled Equity Funds	257,508,015	163,782,858	588,622	93,136,535
Non-U.S. Issues not on Securities Loan:				
International Bonds & Other Fixed Income Instruments	37,988,486	-	36,788,805	1,199,681
International Equity & Commingled Equity Funds	203,640,190	78,045,599	-	125,594,591
Subtotal	653,201,029	243,111,426	81,312,102	328,777,501
Investments Held by Broker-Dealers Under Securities Loans with Cash Collateral:				
U.S. Corporate Bonds & Other Fixed Income Instruments	549,640	-	549,640	-
U.S. Equity	33,215,843	33,215,843	-	-
International Bonds & Other Fixed Income Instruments	177,090	-	177,090	-
International Equity	510,979	510,979	-	-
Subtotal	34,453,552	33,726,822	726,730	-
Securities Lending Short-Term Collateral Investment Pool	35,243,677	-	-	35,243,677
Money Market Funds/Short-Term Investments	21,825,202	-	18,121,066	3,704,136
Real Estate & Commingled Real Estate Funds	77,026,533	-	-	77,026,533
Infrastructure Investment Funds	35,376,363	-	-	35,376,363
Subtotal	169,471,775	-	18,121,066	151,350,709
Total Deposits and Investments	$ 857,126,356	276,838,248	100,159,898	480,128,210

U.S. treasuries, agencies, money market, and equity securities classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for identical securities.

Governmental bonds, corporate bonds, other fixed income instruments, and international bonds classified in Level 2 of the fair value hierarchy are valued based on significant other observable inputs, which may include, but are not limited to, quoted prices for similar assets or liabilities in markets that are active, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the assets or liabilities (such as interest rates, yield curves, volatilities, prepayment speeds, loss severities, credit risks and default rates) or other market corroborated inputs.

Securities valued at Level 3 are based on significant unobservable outputs based on all information available in the circumstances to the extent observable outputs are not available. The fair value of comingled U.S. debt, comingled equity funds, and related short-term investments classified in level 3 represent the value of unit positions in funds that are not publicly traded on an exchange. Fair value of these securities can be impacted by redemption restrictions imposed by the fund managers. Real estate, comingled real estate funds, and infrastructure investment funds are valued using discounted cash flow techniques.

Investment Policy – TSRS Investment Policy and asset class allocations are established by the TSRS Board of Trustees and may be amended by majority vote of its members. The TSRS Board establishes investment policies to pursue an investment strategy that reduces risk through prudent diversification of the portfolio across a broad selection of distinct asset classes.

Long-term Expected Return on Plan Assets - Expected rates of return are determined using a building-block method in which best-estimated ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return were adopted by the Plan's trustees after considering input from the Plan's investment consultant and actuary. For each major asset class that is included in the Plan's adopted target asset allocation as of June 30, 2018, these best estimates are summarized in the table shown below:

Long term expected return on Plan Assets:

Asset Class	Target Allocation	Expected Arithmetic Returns
Large Cap U.S. Equities	26%	5.80%
Small/Mid Cap U.S. Equities	8%	7.05%
International Equities	25%	6.70%
Fixed Income	27%	0.80%
Real Estate	9%	4.65%
Infrastructure	5%	5.75%
Total	100%	
Weighted Average Arithmetic Returns, in proportion to asset allocation		4.67%

Concentrations – TSRS did not hold investments (other than those explicitly guaranteed by the U.S. Government in any one organization that represents 5 percent or more of the Plan's fiduciary net position at June 30, 2018.

Rate of Return – For the year ended June 30, 2018, the annual money-weighted rate of return on the Plan's investments, net of pension plan investment expenses, was 8.92%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Below is a table providing the sensitivity of the net pension liability to changes in the discount rate. In particular, the table presents the plan's net pension liability, if it were calculated using a single discount rate that is 1 percentage-point lower or 1 percentage-point higher than the single discount rate:

1% Decrease 6.25%	Current single discount rate assumption 7.25%	1% Increase 8.25%
$ 335,594,193	$ 230,353,506	$ 140,345,904

Credit Risk – As defined by GASB Statement No. 40, credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Associated with credit risk is concentration of credit risk and custodial credit risk. Concentration of credit risk is the risk of loss attributed to the magnitude of a government's investment in a single issuer. Custodial credit risk for deposits and investments is the risk that, in the event of the failure of a depository financial institution or the counterparty to a transaction, a government will not be able to recover deposits or will not be able to recover collateral securities that are in the possession of an outside party.

The System presently maintains two externally managed fixed income (bond) accounts which are exposed to some form of credit risk. The assets in the first account are actively managed while the assets in the second account are invested in a commingled bond index fund (passively managed).

The TSRS Board has given the actively managed account manager discretion to invest in a broad array of public and private asset classes, instruments and investment vehicles in order to meet or exceed the agreed upon investment return custom benchmark. However, the following specific investment policy guidelines pertain to this manager:

- The maximum position in a single issuer (excluding obligations of U.S. Government and its Agencies) should not exceed 5% of the portfolio's assets at current market value
- The portfolio should maintain an average quality of at least "BB+"
- Money market instruments must be rated in one of the two highest categories by a nationally recognized rating agency
- The minimum rating of individual issues should be CCC (based on market value) as rated by Moody's, Standard & Poor's or Fitch

The passive fund is expected to replicate, as close as possible, the characteristics, quality and performance of its underlying index, the BC Aggregate Bond Index.

The System currently does not have a policy regarding custodial credit risk for deposits or investments as defined in the Credit Risk section above.

The System had the following credit risk structure as of June 30, 2018:

Investment Type	Holdings	Average Credit Rating (1)	Fair Value	Percent of Total
Cash & Short Term Investments:				
Cash & Cash Equivalents	42	Aa1	$ 21,205,280	
Fixed Income Swaps & Options	6	Aa1	414,270	
Futures	2	Aaa	205,656	
Subtotal:	50		21,825,206	10.2%
U.S. Agency & Other Governmental Obligations:				
Municipal Bonds	6	B3	1,282,969	
BlackRock U.S. Debt Fund	1	Aaa	103,512,270	
Subtotal:	7		104,795,239	48.8%
U.S. Corporate Bonds & Other Fixed Income Instruments:				
Collateralized Mortgage Obligations	5	Aa1	302,580	
Banking & Finance	22	Ba2	5,590,803	
Communications	5	Ba1	1,107,581	
Health Care	1	Ba1	934,317	
Retail & Leisure	4	Ba2	579,678	
Oil, Gas & Chemicals	13	Baa3	3,176,982	
Utilities	5	Baa3	764,235	
Real Estate	5	Ba2	541,061	
Fixed Income Swaps & Options	23	Aa2	(185,427)(2)	
PIMCO Private Mortgage Sector Fund	2	Aa1	22,663,347	
Other Corporate Issues	43	Ba2	14,343,583	
Subtotal:	128		49,818,739	23.2%
International Bonds & Other Fixed Income Instruments:				
Banking & Finance	18	Baa1	7,927,705	
Fixed Income Swaps & Options	26	A3	(312,251)(2)	
Communications	7	B1	2,181,248	
Health Care	7	Ba2	741,436	
Oil, Gas & Chemicals	6	Ba2	2,994,804	
Utilities	2	B1	648,602	
Government Debt	30	Baa3	10,203,565	
Other Corporate Issues	48	Baa2	13,780,467	
Subtotal:	144		38,165,576	17.8%
TOTAL:	329		214,604,760	100.0%

Footnotes

(1) Per Moody's Investors Service, Inc. (Moody's)
(2) A negative value in any of the instruments noted above is the result of netting long and short positions against each other. This strategy is utilized as a means to mitigate interest rate risk from holding long positions in mortgages and / or corporate bonds.

Interest Rate Risk – As defined by the Government Accounting Standards Board (GASB) in Statement 40, interest rate risk is the risk that changes in interest rates will adversely affect the fair value of investments. For fixed income securities, there is an inverse relationship between the change in interest rates and their fair value. For example, in a rising interest rate environment the value of fixed income securities will tend to fall by varying degrees depending on the length of their maturities. In general, the value of fixed income securities with a longer duration will tend to decrease more than shorter duration securities in a rising interest rate environment.

The System's investment policy regarding interest rate risk for the actively managed fixed income account, is to limit duration to within 30% of the custom benchmark which is defined as 25% BC Mortgage Index, 25% BC Credit Index, 25% BC High Yield Index and 25% JPM EMBI Global Index. The passive fund should match, as close as possible, the maturity structure and duration of the BC Aggregate Bond Index.

The System had the following maturity structure as of June 30, 2018:

Investment Type	Less than 1 year	1 – 5 years	6 – 10 years	More than 10 years	Fair Value
Cash & Short Term Investments	21,825,206				21,825,206
U.S. Agency & Other Governmental Obligations				1,282,969	1,282,969
BlackRock U.S. Debt Fund			103,512,270		103,512,270
U. S. Corporate & Other Fixed Income Instruments	23,729,786	13,742,169	9,723,626	2,623,159	49,818,739
International Bonds & Other Fixed Income Instruments	1,511,704	16,527,683	12,889,592	7,236,598	38,165,576
TOTAL:	47,066,696	30,269,851	126,125,488	11,142,725	214,604,760

Effective Duration of Active Account: 4.06 years
Effective Duration of Passive Account: 5.83 years

Foreign Currency Risk – As defined by the Governmental Accounting Standards Board (GASB) in Statement 40, foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit.

The TSRS Board has given the System's international equity managers discretion to invest in a broad array of common and preferred stocks, convertibles and warrants of companies headquartered outside of the United States in order to meet or exceed their agreed upon investment return benchmarks. However, the following specific investment policy guidelines pertain to these managers:

- Investments in any single country market should not exceed more than 4 times the weight of the country in the benchmark index or 50% of portfolio assets, whichever is lower
- If a country has a greater than 50% weight in the index, the maximum exposure to that country in the portfolio may be as high as its weight in the index
- No more than 35% of each manager's portfolio should be invested in "emerging markets" (i.e., markets that are not included in the Morgan Stanley Capital International Europe, Australia and Far East Index)
- Managers are permitted to enter into hedging strategies, including cross-currency hedges, using forward currency exchange contracts and currency options
- Derivatives should not be used for the purpose of speculation or for leveraging the portfolio

Foreign Currency Risk (continued from previous page)

The TSRS fund had the following foreign currency risk exposure as of June 30, 2018:

Currency of:	Cash & Cash Equivalent (1)	Fixed Income	Equity	Real Estate	Infra-structure	Foreign Exchange Contracts	Fair Value	%
ARGENTINA	$ 207,514	$ 1,933,321					$ 2,140,836	0.26%
AUSTRALIA	(30,506)		$ 706,967				676,461	0.08%
BERMUDA		295,059	2,030,865				2,325,924	0.28%
BRAZIL REAL	26,197						26,197	0.00%
BRITISH VIRGIN ISLANDS			29,371				29,371	0.00%
CANADA	6,580	175,566	6,981,308				7,163,454	0.87%
CAYMAN ISLANDS		815,624	2,431,548				3,247,171	0.40%
CHINESE YUAN RENMINBI	49						49	0.00%
CROATIA		525,750					525,750	0.06%
CURACAO		392,182	277,370				669,552	0.08%
ECUADOR		372,880					372,880	0.05%
EGYPT		211,764					211,764	0.03%
EURO CURRENCY GEOGRAPHIC	334,748	(269,555)	2,123				67,315	0.01%
FRANCE		1,195,629	2,657,337				3,852,967	0.47%
GERMANY		1,064,607	8,353,976				9,418,583	1.15%
GREECE	927,624						927,624	0.11%
GUERNSEY CI		432,797					432,797	0.05%
INDONESIA		1,577,538					1,577,538	0.19%
IRELAND		499,910	1,264,282				1,764,192	0.21%
ITALY		3,528,267	1,855,922				5,384,188	0.66%
JAPAN	95,545	(17,565)	8,643,171				8,721,151	1.06%
JERSEY CI		1,630,003	825,424				2,455,427	0.30%
LIBERIA			52,732				52,732	0.01%
LUXEMBOURG		2,918,184					2,918,184	0.36%
MARSHALL ISLANDS		175,732	98,400				274,132	0.03%
MEXICO	18	1,619,943					1,619,960	0.20%
NETHERLANDS		3,761,592	4,608,765				8,370,356	1.02%
OMAN		179,008					179,008	0.02%
PANAMA		367,500	69,345				436,845	0.05%
POLISH ZLOTY	12,340						12,340	0.00%
PORTUGAL		249,244					249,244	0.03%
PUERTO RICO			137,655				137,655	0.02%
QATAR		401,230					401,230	0.05%
ROMANIA		233,331					233,331	0.03%
SAUDI ARABIA		590,404					590,404	0.07%
SENEGAL		108,769					108,769	0.01%
SINGAPORE DOLLAR	708						708	0.00%
SOUTH AFRICAN RAND	9,098						9,098	0.00%
SPAIN		1,717,210	847,533				2,564,743	0.31%
SWEDEN			151,263				151,263	0.02%
SWITZERLAND	300,054	1,959,298	7,427,997				9,687,349	1.18%
TURKEY	1,532	1,378,335					1,379,867	0.17%
UKRAINE		895,690					895,690	0.11%
UNITED KINGDOM	153,414	7,246,332	20,160,714		$ 9,494,183		37,054,642	4.51%
UNITED STATES	19,574,633	154,613,978	425,260,959	$ 77,026,533	25,882,180	$ 205,656	702,563,940	85.48%
TOTAL	$ 21,619,550	$192,779,554	$494,875,027	$ 77,026,533	$35,376,363	$ 205,656	$821,882,684	100%

(1) A negative value in the instruments above is the result of netting long and short positions against each other. This strategy is utilized as a means to mitigate interest rate risk obtained from holding long positons in mortgages and/or corporate bonds.

5. SECURITIES LENDING

The Board of Trustees for the Tucson Supplemental Retirement System permits the custodian bank, BNY Mellon, to lend securities to broker-dealers and other entities. Each loan is executed with a simultaneous agreement to return the collateral for the same securities in the future. The custodian bank lends U.S. securities for collateral initially valued at 102% of the fair value of the securities plus any accrued interest. Non-U.S. securities are loaned for collateral initially valued at 105% of the fair value of the securities plus any accrued interest. Collateral is marked-to-market daily. As of June 30, 2018, the carrying amount and fair value of securities on loan was $34,453,552. If the fair value of the pledged collateral falls below the specified levels, additional collateral is required to be pledged by the close of the next business day.

In the event of a borrower's default, the custodian bank is obligated to indemnify the lender if, and to the extent that, the fair value of the collateral is insufficient to replace the loaned securities. BNY Mellon's responsibilities include performing appropriate borrower and collateral investment credit analysis, demanding adequate types and levels of collateral, and complying with applicable Department of Labor and Federal Financial Institutions Examination Council regulations covering securities lending.

Although the average term of the security loans is one week, each loan can be terminated at will by either the lender or the borrower. Cash collateral is invested in a short-term investment pool, which on average had a weighted maturity of 30 days. The relationship between the maturities of the investment pool and the security loans are affected by the maturities of the loans made by other entities that use the agent's pool.

The lender cannot pledge or sell collateral securities received until, and unless, a borrower defaults. There were no significant violations of legal or contractual provisions and no borrower or lending agent default losses known to the securities lending agent during the fiscal year. As of June 30, 2018, the lenders had no credit risk exposure to borrowers because the fair value of collateral held exceeded the fair value of securities loaned.

6. DERIVATIVES

The Tucson Supplemental Retirement System permits the limited use of derivatives by its international equity and external fixed income managers. Examples of derivative instruments permitted, but not limited to, are forward foreign currency exchange contracts, financial futures, options, swaps and swaptions. All derivative instruments utilized are considered "Investment Derivative Instruments" as defined in GASB 53 "Accounting and Financial Reporting for Derivative Instruments." The statement addresses the recognition, measurement, and disclosure regarding derivative instruments entered into by the System.

The following table is a summary of the various derivative instruments utilized by the System's external fixed income manager as of June 30, 2018. Changes in Fair Value are included as part of the overall Increase (Decrease) in Fair Value of Investments in the Statement of Changes in Plan Net Position. Fair Value is included as part of investments listed under Corporate Bonds & Other Fixed Income Instruments in the Statement of Plan Net Position.

Investment Derivative Instrument	Notional Amount (1)	Changes in Fair Value	Fair Value (2)	Principal Risk
Government Futures	22,700,000	2,465,607	28,385,063	Interest Rate Risk
Options	(12,843,056)	20,879	(24,504)	Credit Risk
Interest Rate Swaps	(30,335,923)	(3,905,758)	(30,545,710)	Interest Rate Risk
Credit Default Swaps	(17,807,306)	(17,364,605)	31,711,469	Credit Risk

(1) The Notional Amount is the number of currency units (stated in U.S. and/or foreign currencies), shares or other units specified in the derivative instrument. It is a stated amount on which payments depend.
(2) The notional fair value of the underlying securities is reported in this schedule. Fair market value as reported in the financial statements is presented net of long and short positions.

Whenever possible, the investment manager bases the valuation of derivatives on market information; however, where market quotes are not readily available, an independent third party pricing vendor is utilized. Exchange traded derivatives are an example of derivatives where market quotes are available, whereas over-the counter (OTC) derivatives are not traded over standardized markets.

In addition to the principal risks noted above, Forward Foreign Currencies, Credit Default Swaps and Interest Rate Swaps are also subject to counterparty risk. In general, counterparty risk is the risk of loss of an amount expected to be delivered under an agreement in the event of the default or bankruptcy of the counterparty. Generally, counterparty risk is controlled through dealing with a number of different counterparties reasonably deemed to be creditworthy by the investment manager and using agreements with counterparties that permit netting of obligations. Counterparty risk with swaps is limited by execution under standardized International Swap and Derivatives Association Agreements. These contracts allow for the mutual exchange of collateral should an overall unsecured market value exceed a certain threshold (e.g., $250,000).

Credit, interest rate and foreign currency risks are addressed in previous sections of Note 4. These risks, applicable to other fixed income and foreign investments, are not substantially different from principal risks associated with derivative instruments.

7. ACTUARIAL METHODS AND ASSUMPTIONS

The total pension liability was determined by an actuarial valuation as of June 30, 2018, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	3.00% to 6.50% including inflation
Investment Rate of Return	7.25%

Mortality rates were based on the RP-2000 Combined Mortality Table for males and females, projected with Scale BB to 2020. The actuarial assumptions used in the June 30, 2018 valuation were based on the results of an actuarial experience study for period July 1, 2008 – June 30, 2013.

Additional Details: In the June 30, 2018 actuarial valuation, the level-percent contribution requirements and actuarial present values are calculated using the entry age normal actuarial cost method. The actuarial assumptions included (a) 7.25 percent investment rate of return (net of administrative expenses); (b) projected salary increases at 3.00% compounded annually; and (c) additional projected salary increases of 0.00% to 3.50% attributable to seniority / merit. The assumptions do not include postretirement benefit increases or inflation assumptions, because there is no guarantee or requirement that future increases will be granted.

The projection of benefits for financial accounting purposes also does not explicitly incorporate the potential effects of legal or contractual funding limitations, since they do not apply. The actuarial value of assets was determined using techniques that spread the effects of short term volatility in the market value of assets over a five-year smoothing period, which was first adopted for the plan year ended June 30, 2009. The Unfunded Actuarial Accrued Liability is being amortized as a level percentage of payroll on an open period of 20 years; the new amortization period was first adopted for the plan year ended June 30, 2013. There were no benefit changes during the year ended June 30, 2018.

The assumptions are selected based upon the recommendation of the plan's actuary and adopted by the Board of Trustees.

Measurement of Net Pension Liability: The net pension liability is measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirements.

A single discount rate of 7.25% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.25%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investment was applied to all period of projected benefit payments to determine the total pension liability.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of changes in net pension liability*

	2018	2017	2016	2015	2014
Total pension liability					
Service cost	$ 13,104,720	$ 13,130,902	$ 14,279,065	$ 15,753,944	$ 14,825,019
Interest on total pension liability	72,893,717	72,547,402	72,013,831	70,688,775	66,915,612
Difference between expected and actual experience of the total pension liability	6,919,468	(6,472,776)	(6,529,764)	(7,815,270)	325,889
Changes of assumptions				(31,210,057)	76,945,563
Benefit payments, including refunds of employee contributions	(75,618,198)	(73,213,157)	(70,445,750)	(67,612,351)	(66,002,013)
Net change in total pension liability	17,299,707	5,992,371	9,317,382	(20,194,959)	93,010,070
Total pension liability - beginning	1,036,687,317	1,030,694,946	1,021,377,564	1,041,572,523	948,562,453
Total pension liability - ending	$ 1,053,987,024	$ 1,036,687,317	$ 1,030,694,946	$ 1,021,377,564	$1,041,572,523
Plan fiduciary net position					
Contributions - employer	$ 31,795,197	$ 31,823,694	$ 33,175,307	$ 33,985,523	$ 34,189,288
Contributions - member	8,561,747	7,439,065	7,083,385	7,531,845	7,338,543
Net investment income	69,447,542	97,535,597	17,820,325	30,684,188	119,729,154
Benefit payments, including refunds of member contributions	(75,618,198)	(73,213,157)	(70,445,750)	(67,612,351)	(66,002,013)
Administrative expense	(745,753)	(756,268)	(786,028)	(650,405)	(735,739)
Other	250,046	331,127	142,093	118,247	171,077
Net change in plan fiduciary net position	33,690,581	63,160,058	(13,010,668)	4,057,047	94,690,310
Plan fiduciary net position - beginning	789,942,937	726,782,879	739,793,547	735,736,500	641,046,190
Plan fiduciary net position - ending	$ 823,633,518	$ 789,942,937	$ 726,782,879	$ 739,793,547	$ 735,736,500
Net pension Liability - ending	$ 230,353,506	$ 246,744,380	$ 303,912,067	$ 281,584,017	$ 305,836,023

*Schedule is presented on a prospective basis from FY 2014 and will eventually include 10 years of data.

Schedule of net position liability last five years*

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of total pension liability	Covered payroll	Net Pension liability as a % of covered payroll
2014	1,041,572,523	735,736,500	305,836,023	70.64%	126,206,305	242.33%
2015	1,021,377,564	739,793,547	281,584,017	72.43%	123,583,720	227.85%
2016	1,030,694,946	726,782,879	303,912,067	70.51%	120,637,480	251.92%
2017	1,036,687,317	789,942,937	246,744,380	76.20%	115,722,524	213.22%
2018	1,053,987,024	823,633,518	230,353,506	78.14%	115,618,898	199.24%

Schedule of Investment Returns*

	2018	2017	2016	2015	2014
Annual Money-Weighted Rate of Return, Net of Investment Expense	8.84%	14.26%	2.38%	4.17%	19.17%

*Schedules are presented on a prospective basis from FY 2014 and will eventually include 10 years of data.

Schedule of Contributions

Fiscal Year Ending June 30,	Actuarially Determined Contribution (ADC)		Actual Contribution		Contribution Deficiency (Excess)	Covered Payroll	Actual contributions in relation to ADC expressed as a % of covered payroll
	Dollars	% of pay	Dollars	% of pay			
2009	24,358,460	14.67%	24,358,460	14.67%	n/a	166,042,672	n/a
2010	27,601,156	16.84%	27,601,156	16.84%	n/a	163,902,352	n/a
2011	28,756,890	18.02%	28,756,890	18.02%	n/a	159,583,185	n/a
2012	34,824,621	23.38%	34,824,621	23.38%	n/a	148,950,475	n/a
2013	34,523,315	28.77%	34,523,315	28.77%	n/a	119,997,619	n/a
2014	34,189,288	27.09%	34,189,288	27.09%	n/a	126,206,305	n/a
2015	33,305,813	26.95%	33,985,523	27.50%	(679,710)	123,583,720	100.5%
2016	32,608,311	27.04%	33,175,307	27.50%	(566,996)	120,637,480	100.5%
2017	29,532,388	25.52%	31,823,694	27.50%	(2,291,306)	115,722,524	102.0%
2018	29,806,552	25.78%	31,795,197	27.50%	(1,988,645)	115,618,898	101.7%

Summary of Actuarial Methods and Assumptions

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	Actuarially determined contribution rates are calculated for the fiscal year beginning one year after the valuation date (one year lag). The actuarial valuation as of June 30, 2016 determines the contribution for fiscal year ending June 30, 2018.
Methods and Assumptions Used to Determine Contribution Rates:	
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Open
Remaining Amortization Period	20 years
Asset Valuation Method	5 Year smoothed market
Inflation	3.00%
Salary Increases	3.00% to 6.50% including inflation
Investment Rate of Return	7.25%
Retirement Age	Age-based table of rates that are specific to the type of eligibility condition. Last updated for the 2009 valuation pursuant to an experience study of the period 2009 - 2013.
Mortality	Pre and Post-retirement: RP-2000 Combined Mortality Table for males and females projected with Scale BB to 2020. Disabled retirement: RP-2000 Disabled Mortality Table for males and females.
Other Information:	
Notes	There were no benefit changes during the year.

OTHER SUPPLEMENTAL INFORMATION

Schedule of administrative expenses

Personal services		
Staff salaries	$	252,523
Fringe benefits		143,978
Total personal services		396,500
Professional services		
Accounting services		96,000
Actuarial services		129,824
Audit services		8,050
Physician services		1,500
Legal services		10,260
Total professional services		245,634
Other administrative expenses		
Computer software maintenance & hosting		38,440
Insurance		20,165
Other administrative expenses		9,232
Postage		15,136
Printing and supplies		9,539
Professional development		11,107
Total other administrative expenses		103,619
Total administrative expenses	$	745,753

Schedule of investment services expenses

Trust and custody	$	305,690
Investment consultant		162,664
Carried interest cost		3,693,032
Investment management		4,435,406
Total investment expenses	$	8,596,792

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October 31, 2018

The Board of Trustees
Tucson Supplemental Retirement System
255 W. Alameda Street
Tucson, AZ 85701

Dear Board Members,

This letter reviews the general economic environment, capital markets, and investment performance of the Tucson Supplemental Retirement System (TSRS) for the fiscal year ended June 30, 2018.

Economic Overview as of June 30, 2018

In the second half of the 2017 calendar year, markets were characterized by low volatility and record highs across the S&P 500, NASDAQ, and DJIA. The VIX Index, a widely used measure of expected stock market volatility, fell more than 20% in 2017, reaching an all-time low in November. The U.S. economy was supported by strong GDP growth on the back of consumer spending and low unemployment. Growth was further fueled by the passing of significant tax reform which cut corporate taxes in addition to reducing personal tax rates. International equities also performed well in the second half of 2017, bolstered by global growth. Emerging markets were a notable outperformer during the year as the region was supported by a weakening dollar and a global appetite for risk assets. Commodities also appreciated in the second half of 2017. Oil prices climbed dramatically on the back of global demand, particularly from China. The Federal Open Market Committee elected not to hike rates in its September meeting, but increased the targeted federal funds rate by 25 basis points in December. Investors' search for yield continued in the second half of 2017 which drove up both high yield and investment grade credit prices.

The beginning of the 2018 calendar year witnessed a continuation of 2017 market trends. Equities roared throughout January and the VIX approached its November lows. However, the seemingly impervious bull market showed signs of weakness in February as markets were rattled by a labor report that released low unemployment figures and rising wages. These signals were interpreted to be inflationary and on February 5th, the VIX spiked 116% as investors feared an accelerated rate hike schedule by the Federal Reserve. The expectations of inflation also impacted bond prices as yields rose. By the end of the first quarter, both bond and equity markets were negative in the U.S. In the second quarter, markets recovered as economic growth continued and corporate earnings remained strong. Headlines were soon dominated by geopolitical tensions as the U.S. launched an agenda of protectionist trade policies. Small cap equities outperformed larger peers as investors sought insulation from global conflict. Growth outperformed value, with the Technology and Consumer Discretionary sectors driving gains. Emerging Markets were challenged in 2018, hindered by a stronger dollar and global trade tensions. European markets were mixed, as generally positive economic data coincided with political turmoil in the way of tariffs, political scandal in Spain and a new populist coalition government in Italy. Rates in the U.S. climbed in 2018, with the Federal Reserve announcing 25 basis point hikes in both the first and second quarters.

U.S. GDP growth was strong during the previous fiscal year. The third estimate of second quarter GDP growth in the U.S. reported an annualized rate of 4.2%. Euro zone GDP increased 2.1% over the same period. Positive growth and low unemployment in both regions have been overshadowed by the looming specter of trade wars and a potential slowing of the current bull market.

Total Fund Review

In fiscal year 2018, TSRS returned 9.88% before investment management fees, which ranked in the 12th percentile versus other public defined benefit plans. TSRS returned 8.84% net of fees for the fiscal year, which was above the benchmark return of 7.96%. TSRS uses a time weighted rate of return methodology. Returns are calculated by an independent third party using data provided by the custodian bank.

Domestic Equity Overview

U.S. equities recorded impressive gains in the fiscal year ended June 30, 2018. The Russell 3000 Index, a broad market indicator for the U.S. stock market, finished the fiscal year up 14.78%. Small cap stocks performed better than large cap stocks during the time period. The Russell 1000, a gauge of large cap stock performance, was beaten by its small cap peer by a modest margin. The Russell 1000 rose 14.54% while the Russell 2000 gained 17.57%. Growth stocks, however, significantly outperformed value stocks. The Russell 3000 Growth Index advanced 22.47% versus a 7.25% increase for the Russell 3000 Value Index. During the fiscal year ended June 30, 2018 the TSRS domestic equity investments returned 16.55% net of fees.

International Equity Overview

Developed International equity markets, as represented by the MSCI EAFE Index, appreciated in fiscal year 2018, but underperformed the U.S. The index rose 6.84%, which dramatically underperformed the 20.27% performance in fiscal year 2017. In sync with U.S. equity trends, growth outperformed value in the international developed equity space as well. For the trailing twelve-months ended June 30, 2018, the MSCI EAFE Growth Index gained 9.41% while the MSCI EAFE Value Index rose 4.25%. Emerging markets produced gains during the first half of the fiscal year before peaking in January and subsequently declining into year-end. The MSCI Emerging Markets Index appreciated 8.20% over the trailing 12-months ended June 30, 2018. Overall, it was a positive year for international stock markets. For the fiscal year of 2018, the international equity asset class returned 8.12% net of fees for TSRS.

Domestic Fixed Income Overview

The U.S. bond market, as measured by the Bloomberg Barclays Aggregate Bond Index, fell 0.40% in fiscal year 2018. The yield curve shifted upward and flattened throughout the period, punishing many bond holders. The Bloomberg Barclays Government Index fell 0.63% over the 12-month period while the Bloomberg Barclays Government Long Index dropped 0.13%. The Bloomberg Barclays Credit Index dropped 0.65% for the same time period, as spreads widened modestly versus Treasuries. High yield bonds led performance in fixed income, with a return of 2.62% over the trailing 12-months (Bloomberg Barclays Corporate High Yield Index). For the fiscal year 2018, TSRS's domestic fixed income investments returned 0.14% net of fees.

Real Estate Overview

The NCREIF Property Index, a measure of the private real estate market, gained 7.19% during the 2018 fiscal year. The index was positive in each of the four quarters, extending its winning streak to 34 straight quarters. During the year ended June 30, 2018 TSRS's real estate portfolio returned 7.35% net of fees.

Infrastructure Overview

By definition, infrastructure assets are essential to the economic health and productivity of civilized society. They include the basic facilities, services, and installations needed for the functioning of a community, such as transit and communications systems; both potable and sewage water lines; and electricity access. They also include such public entities as schools, post offices, and incarceration facilities. Most of these facilities have traditionally been owned and regulated by municipalities and states. The private sector's participation has been limited, to varying degrees, to the areas of design, construction, and operation. Budget and fiscal pressures limit the ability of public authorities to maintain existing infrastructure, much less to build the new facilities required by a growing population. In response to these problems, many municipalities and states have sold or are contemplating the sale of their infrastructure assets to private investors. Over the trailing 12-month period ended June 30, 2018, the infrastructure investment program for TSRS returned 8.04% net of fees.

Cordially,

Paul Erlendson	Gordon Weightman, CFA
Senior Vice President	Senior Vice President

Outline of Investment Policies

The asset allocation policy includes a 59% allocation to equity securities: 26% to large U.S. stocks; split among S&P 500 index, enhanced index, large capitalization growth and value accounts; 8% to mid-cap and small-cap U.S. stock accounts; and 25% to foreign stock accounts. There is also an allocation of 27% to fixed income, 9% to equity real estate and 5% to infrastructure.

The Board has set an asset allocation target range on each asset class, sub-class, and manager. The Board of Trustees has adopted a policy of rebalancing the portfolio when the actual allocation falls above or below the target range.

Over the long term, asset allocation policy will be the primary determinant of the returns generated by the TSRS pension fund and the associated volatility of returns. In particular, the level of equity exposure is the key element within the TSRS pension investment policies.

In developing asset allocation policies for its pension plan, the Board examined asset and liability projections to evaluate possible results over the next ten years. These projections examined the risk/return tradeoffs of alternative asset classes, as well as alternative levels of equity exposure. Through incorporating the results of these projections with its risk posture, as well as considering typical practices and practical investment issues, the Board has developed the following asset mix guidelines:

	Percent of Total Pension Fund		
	Minimum	**Target**	**Maximum**
Equities:			
Large Capitalization	21%	26%	31%
Small/Mid Capitalization	4%	8%	12%
International	20%	25%	30%
Total Equities	**54%**	**59%**	**64%**
Fixed Income	**22%**	**27%**	**32%**
Real Estate	**7%**	**9%**	**11%**
Infrastructure	**3%**	**5%**	**7%**

Separate target ranges are also set for each investment manager within an asset class and are monitored in conjunction with the overall asset allocation. TSRS monitors its asset mix and rebalances its portfolio mix at any time that a primary asset class (i.e., equities, fixed-income, and real estate), secondary asset class (i.e., domestic equities, international equities), portfolio style, or manager reaches the minimum or maximum allocation specified. Staff is authorized to direct rebalancing and report to the Board.

Investment Objectives

Total Pension Fund Performance Objectives:[1]

The TSRS Pension Fund's return will be, in part, a function of the capital market environment in which the plan's investment managers operate. Therefore, regardless of whether or not the market environment permits the achievement of substantial real returns, the TSRS expects any active investment managers that it retains to produce results that are above average relative to other actively-managed funds and relative to passive alternatives. Investment managers should cover the fees paid and provide a return increment that justifies the risk assumed in active management.

On a rolling three-year basis, the annualized total return of the portfolio should exceed the annualized total return of the following custom index:

- Standard & Poor's 500 Stock Index (26% weight)
- Russell 2500 Stock Index (8% weight)
- MSCI All Country World, ex-U.S. Investable Market Index (25% weight)
- Barclays Capital Aggregate Bond Index (27% weight)
- NCREIF ODCE Real Estate Index (9% weight)
- CPI + 4% (5% weight)

[1] The investment objectives defined herein assume that performance comparisons will be based on a before-fee analysis, unless otherwise indicated.

Individual Managers Performance Objectives

On a rolling three-year basis, the annualized total return earned by an actively managed portfolio should place the account in a competitive ranking (i.e., top 40%) relative to a peer group of managers. In addition, the managers should outperform the following market index benchmarks:

T. Rowe Price (Large Cap Growth Equity)
- Exceed the annualized total return of the Russell 1000 Growth Index

BlackRock Value (Russell 1000 Value Index)
- Match the annualized total return of the Russell 1000 Value Index

Alliance Capital (S&P 500 Index)
- Match the annualized total return of the S&P 500 Index

PIMCO StocksPlus (Enhanced Index)
- Exceed the annualized total return of the S&P 500 Index

Champlain Investment Partners (Mid Cap Core Equity)
- Exceed the annualized total return of the Russell Mid Cap Index

Fidelity Institutional Asset Management (Small Cap Equity)[1]
- Exceed the annualized total return of the Russell 2000 Stock Index

Aberdeen Asset Management (International Core Equity)
- Exceed the annualized total return of the MSCI AC World ex-U.S. Index

Causeway Capital Management (International Value Equity)
- Exceed the annualized total return of the MSCI AC World ex-U.S. Index

American Century Investments (International Small Cap)
- Exceed the annualized total return of the MSCI AC World ex-U.S. Small Cap Index

PIMCO (Custom Fixed Income)
- Exceed the annualized total return of a customized fixed income benchmark composed of 25% BC Mortgage, 25% BC Credit, 25% BC High Yield and 25% JP Morgan EMBI index

BlackRock U.S. Debt Index Fund (U.S. Investment Grade Fixed Income)
- Match the annualized total return of the BC Aggregate Bond Index

JP Morgan Strategic Property Fund (Core Real Estate)
- Exceed the annualized total return of the NCREIF ODCE Real Estate Index

JP Morgan Income & Growth Fund (Value Added Real Estate)
- Exceed the annualized total return of the NCREIF ODCE Real Estate Index

Macquarie European Infrastructure Fund 3 (European Infrastructure)
- Exceed the annualized total return of the CPI + 4%

SteelRiver Infrastructure Fund North America (North America Infrastructure)
- Exceed the annualized total return of the CPI + 4%

[1] This Manager was formerly known as Pyramis Global Advisors

Investment Results by Year
Last Ten Fiscal Years Ended June 30, 2018

Year Ended	Annual Return	3-Year Annualized Return	5-Year Annualized Return	10-Year Annualized Return
6/30/18	9.9%	8.9%	10.1%	7.5%
6/30/17	14.8%	7.1%	11.0%	6.0%
6/30/16	2.4%	8.1%	8.0%	5.7%
6/30/15	4.6%	12.9%	12.6%	7.1%
6/30/14	19.6%	12.1%	14.1%	7.5%
6/30/13	14.8%	13.2%	5.0%	7.4%
6/30/12	2.4%	12.1%	1.2%	6.2%
6/30/11	23.2%	2.8%	4.0%	5.1%
6/30/10	11.6%	-5.6%	1.8%	2.1%
6/30/09	-21.0%	-4.1%	1.3%	2.0%
6/30/08	-4.6%	7.3%	9.8%	5.5%

Schedule of Investment Results
For Periods Ended June 30, 2018

		Annualized Returns (1)	
	One Year	Three Years	Five Years
TOTAL PORTFOLIO			
TSRS	9.88%	8.87%	10.07%
Custom Benchmark (2)	7.96%	7.19%	8.49%
EQUITY FUNDS			
Alliance S&P 500 Index	14.33%	11.88%	13.37%
S & P 500 Index	14.37%	11.93%	13.42%
PIMCO Stocks Plus	14.13%	11.76%	13.78%
S & P 500 Index	14.37%	11.93%	13.42%
BlackRock Russell 1000 Value Index	6.88%	8.28%	10.41%
Russell 1000 Value Index	6.77%	8.26%	10.34%
T. Rowe Price Large Cap Growth	29.95%	18.54%	19.97%
Russell 1000 Growth Index	22.51%	14.98%	16.36%
Champlain Investment Partners	18.85%	15.06%	16.22%
Russell Mid Cap Index	12.33%	9.58%	12.22%
Fidelity Institutional Asset Management Small Cap	17.78%	10.95%	13.24%
Russell 2000 Index	17.57%	10.96%	10.60%
Causeway International Value Equity	7.29%	5.36%	7.16%
MSCI EAFE Index	7.28%	5.39%	6.74%
Aberdeen EAFE Plus Equity	3.38%	4.16%	3.71%
MSCI All Country World ex-U.S. Index (Net)	7.28%	5.07%	5.99%
American Century Non U.S. Small Cap (Inception date: 5/16) (4)	23.87%	13.25%	N/A
MSCI All Country World ex-U.S. Small Cap	10.57%	7.94%	N/A
FIXED INCOME FUNDS			
BlackRock U.S. Debt Fund (Inception date: 1/12)	-0.31%	1.82%	2.39%
Barclays Aggregate Bond Index	-0.40%	1.72%	2.27%
PIMCO Custom Fixed Income	1.16%	5.19%	5.00%
Custom Index (3)	-1.05%	3.29%	3.79%
REAL ESTATE FUNDS			
JP Morgan Strategic Property Fund	7.80%	8.94%	10.83%
NCREIF ODCE Index	8.44%	9.37%	11.04%
JP Morgan Income and Growth Fund	9.56%	9.29%	11.11%
NCREIF ODCE Index	8.44%	9.37%	11.04%

Notes: All data provided by independent investment consultant, Callan Associates Inc.
(1) Geometrically compounded, time-weighted rates of return (all returns reported gross of fees)
(2) Custom Benchmark = 36% S&P 500 Index + 10% Russell 2500 + 15% MSCI ACWI ex-U.S (Net) + 26% Barclays Capital Aggregate + 8% NCREIF ODCE + 5% CPI+4%
(3) Custom Index = 25% Barclays Capital Mortgage + 25% Barclays Capital Credit + 25% Barclays Capital High Yield + 25% JP Morgan EMBI Global
(4) As the American Century Non-U.S. Small Mid Cap Strategy was funded in May of 2016 the one year and annualized return data is not yet available.

Schedule of Investment Results

For Periods Ended June 30, 2018 (Continued)

		Annualized Returns (1)	
	One Year	**Three Years**	**Five Years**
INFRASTRUCTURE FUNDS			
Macquarie European Infrastructure Fund 3 (Funding Completed)	59.87%	27.03%	16.25%
CPI + 4%	7.09%	5.74%	5.37%
SteelRiver Infrastructure Fund North America (Funding in progress)	-2.94%	6.97%	8.97%
CPI + 4%	7.09%	5.74%	5.37%

Notes: All data provided by independent investment consultant, Callan Associates Inc.
(1) Geometrically compounded, time-weighted rates of return (all returns reported gross of fees)

Asset Summary
By Manager and Type of Investment (in thousands)
June 30, 2018

Manager	Style	Large U.S. Stocks	Small/Mid U.S. Stocks	Foreign Stocks	Fixed Income	Real Estate	Infra-structure	Short Term	Total
Alliance Capital	S & P 500 Index	$ 68,858	$ -	$ -	$ -	$ -	$ -	$ 146	$ 69,004
T. Rowe Price	Large Cap Growth	56,157						743	56,900
BlackRock Russell Value	Large Cap Value Index	56,614							56,614
PIMCO StocksPlus	Enhanced Index	36,523							36,523
Champlain Investments	Mid-Cap Core		37,322					354	37,676
Fidelity Institutional Asset Mgmt.	Small-Cap Core		34,661					214	34,875
Causeway Capital	Foreign Stocks-Value			78,556				1,676	80,232
Aberdeen Asset Mgmt	Foreign Stocks-Core			81,530					81,530
American Century Investments	Foreign Stocks-Small Cap			44,065					44,065
BlackRock U.S. Debt	U.S. Govt/Credit Bonds				103,512				103,512
PIMCO Custom Fixed Income	U.S. & Foreign Bonds				89,856			16,898	106,754
JPM Strategic Property Fund	Core Real Estate					51,121		1	51,122
JPM Income & Growth Fund	Value Added Real Estate					25,906		1,181	27,087
Macquarie (MEIF3)	European Infrastructure						9,494		9,494
SteelRiver IFNA	North American Infrastructure						25,882		25,882
Liquidity Fund	Cash & Cash Equivalents							612	612
	TOTAL	$ 218,152	$ 71,983	$204,151	$193,368	$ 77,027	$ 35,376	$21,825	$821,882

Notes:

(1) The Asset Summary does not include the City pooled investment account. (2) Assets are reflected on a trade date basis.

(3) Short-term investments have been adjusted for the net impact of unsettled transactions in order to report on a trade date

basis. (4) Each asset class includes receivables and payables.

Manager and Asset Diversification (in thousands)
June 30, 2018

Manager	Actual Amount	Actual Percentage	Target Amount	Target Percentage
Alliance Capital	$ 69,004	8.4%	$ 57,532	7.0%
T. Rowe Price	56,900	6.9%	57,532	7.0%
BlackRock Russell Value	56,614	6.9%	65,751	8.0%
PIMCO StocksPlus	36,523	4.4%	32,875	4.0%
Large U.S. Stocks	**219,041**	**26.6%**	**213,690**	**26.0%**
Champlain Investment Partners	37,676	4.6%	32,875	4.0%
Fidelity Institutional Asset Mgmt.	34,875	4.2%	32,875	4.0%
Small/Mid-Cap U.S. Stocks	**72,551**	**8.8%**	**65,750**	**8.0%**
Causeway Capital	80,232	9.8%	82,188	10.0%
Aberdeen Asset Management	81,530	9.9%	82,188	10.0%
American Century Investments	44,065	5.4%	41,094	5.0%
Foreign (International) Stocks	**205,827**	**25.1%**	**205,470**	**25.0%**
Total Equities	**497,419**	**60.5%**	**484,910**	**59.0%**
BlackRock U.S. Debt	103,512	12.6%	110,953	13.5%
PIMCO Custom Fixed Income	106,754	13.0%	110,954	13.5%
Fixed Income (Bonds)	**210,266**	**25.6%**	**221,907**	**27.0%**
JPM Strategic Property Fund	51,122	6.2%	49,313	6.0%
JPM Income & Growth Fund	27,087	3.3%	24,656	3.0%
Real Estate	**78,209**	**9.5%**	**73,969**	**9.0%**
Macquarie (MEIF3)	9,494	1.2%	20,547	2.5%
SteelRiver IFNA	25,882	3.1%	20,548	2.5%
Infrastructure	**35,376**	**4.3%**	**41,095**	**5.0%**
Liquidity Fund	612	0.1%	-	0.0%
Total	**$ 821,882**	**100%**	**$ 821,881**	**100%**

Asset Allocation by Asset Class
Last Five Fiscal Years

Asset Class	2018	2017	2016	2015	2014	2013
U.S. Stocks	36%	35%	34%	51%	50%	48%
Foreign (International) Stocks	25%	25%	23%	13%	14%	14%
Total Equities	61%	60%	57%	64%	64%	62%
Fixed Income (Bonds)	26%	26%	27%	22%	22%	24%
Real Estate	9%	10%	9%	8%	8%	8%
Infrastructure	4%	4%	7%	6%	6%	6%
Cash	0%	0%	0%	0%	0%	0%
Total Assets	100%	100%	100%	100%	100%	100%

Ten Largest Bond Holdings
(By Market Value)
June 30, 2018
(dollars in thousands)

Par Value	Bond	Coupon Rate	Due	Rating (1)	Fair Value
$ 1,550	UBS AG/Stamford CT	7.625%	08/17/22	Baa1	$ 1,711
1,700	Tallgrass Energy Paretners 144A	5.500%	01/15/28	Ba3	1,670
1,500	Blackstone CQP Hold Co, LP	6.500%	03/20/21	B2	1,500
1,500	Petroleos Mexicanos	6.625%	06/15/35	Baa3	1,466
1,000	International Lease Finance Co	8.250%	12/15/20	Baa3	1,101
1,100	Perusahaan Penerbit SBSN 144A	3.750%	03/01/23	Baa2	1,077
900	Italy Buoni Poliennali Del Tes	0.650%	10/15/23	Baa2	987
827	Ally Financial Inc	8.000%	11/01/31	Ba3	984
1,000	Altice France SA/France 144A	7.375%	05/01/26	B1	978
900	HCA Inc	6.500%	02/15/20	Ba1	934

(1) Per Moody's Investors Service, Inc.

Ten Largest Stock Holdings
(By Market Value)
June 30, 2018
(dollars in thousands)

Shares	Stock	Fair Value
4,136	Amazon.com Inc.	$ 7,030
56,108	Microsoft Corp	5,533
21,127	Facebook, Inc.	4,105
19,946	Apple Inc.	3,692
3,182	Alphabet, Inc, Cass A	3,593
24,434	Visa, Inc.	3,236
9,534	The Boeing Company	3,199
1,470	Booking Holdings, Inc.	2,980
15,218	Volkswagen	2,527
10,381	LINDE AG	2,477

A complete list of portfolio holdings is available by contacting:
City of Tucson Supplemental Retirement System,
255 W. Alameda Street, 3rd floor, Tucson, AZ 85701-1303

Schedule of Fees
June 30, 2018

Investment manager fees:	Assets under management	Fees
Fixed income managers		
BlackRock U.S. Debt	$ 103,512,271	$ 67,423
PIMCO (Custom fixed income)	107,789,841	499,730
Total fixed Income	211,302,112	567,153
Equity Managers		
Alliance Capital Management	69,093,270	25,769
BlackRock Russell Value Index	56,613,874	27,229
T. Rowe Price	57,314,321	218,732
Causeway Capital Management	80,797,239	300,220
Fidelity Institutional Asset Management	35,093,630	237,562
Aberdeen Asset Management	81,529,891	574,299
American Century Investments	44,064,891	417,010
PIMCO Stock Plus	36,522,661	0
Champlain Investment Partners	37,774,460	284,937
Total Equity	498,804,237	2,085,758
Liquidity Account	611,778	
Real Estate Managers		
JP Morgan Strategic Property Fund	51,121,614	490,550
JP Morgan Income & Growth Fund	26,800,830	270,442
Total Real Estate	77,922,444	760,992
Infrastructure Managers		
Macquarie (MEIF3)	9,494,183	139,074
SteelRiver (IFNA)	25,882,179	152,606
Total Infrastructure	35,376,362	291,680
Total assets		
Total investment management fees	$ 824,016,933	$ 3,705,583
Other investment service fees		
Carried interest, Macquarie (MEIF3)		4,462,910
Carried interest, SteelRiver (IFNA)		(27,505)
Trust & custodian fees, BNY Mellon		291,540
Security lending - Bank & Administration Fees, BNY Mellon		54,675
Consulting & performance management, Callan Associates Inc.		216,886
Total Other investment service fees		$ 4,998,506

Schedule of Commissions

June 30, 2018

Broker Description	Shares	Commissions	Commissions Per Share
CREDIT SUISSE, NEW YORK (CSUS)	488,083	$8,432.54	0.01728
MORGAN STANLEY & CO INC, NY	537,933	7,372.83	0.01371
GOLDMAN SACHS & CO, NY	308,297	6,566.29	0.02130
MERRILL LYNCH INTL LONDON EQUITIES	397,459	4,482.57	0.01128
J P MORGAN SECS LTD, LONDON	362,163	3,446.99	0.00952
CITIGROUP GLOBAL MARKETS LTD, LONDON	318,717	2,900.69	0.00910
UBS WARBURG, LONDON	422,539	2,770.27	0.00656
J.P. MORGAN CLEARING CORP, NEW YORK	146,418	2,566.64	0.01753
MERRILL LYNCH PIERCE FENNER SMITH INC NY	150,357	2,396.35	0.01594
DEUTSCHE BK SECS INC, NY (NWSCUS33)	149,408	2,129.09	0.01425
STIFEL NICOLAUS	65,671	1,984.01	0.03021
LIQUIDNET INC, NEW YORK	78,749	1,940.19	0.02464
JEFFERIES & CO INC, NEW YORK	89,429	1,793.49	0.02005
UBS SECURITIES LLC, STAMFORD	85,187	1,569.55	0.01842
RBC CAPITAL MARKETS LLC, NEW YORK	166,475	1,558.78	0.00936
BARCLAYS CAPITAL, LONDON (BARCGB33)	31,829	1,475.50	0.04636
UBS WARBURG ASIA LTD, HONG KONG	90,010	1,424.65	0.01583
CITIGROUP GBL MKTS INC, NEW YORK	86,663	1,385.94	0.01599
BARCLAYS CAPITAL INC./LE, NEW JERSEY	74,079	1,379.40	0.01862
CITIGROUP GBL MKTS/SALOMON, NEW YORK	99,936	1,340.79	0.01342
ITG INC, NEW YORK	81,892	1,202.14	0.01468
HSBC BANK PLC (MIDLAND BK)(JAC), LONDON	53,197	1,164.07	0.02188
INSTINET CORP, NEW YORK	67,399	1,004.86	0.01491
Various Brokers, less than $1,000	667,811	15,052.29	
TOTAL	**5,019,701**	**$77,340**	
AVERAGE COMMISSION RATE			**$0.0154**

CITY OF TUCSON, ARIZONA

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GRS Retirement Consulting

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December 6, 2018

The Board of Trustees
Tucson Supplemental Retirement System
Tucson, Arizona

Re: June 30, 2018 Actuarial Valuation and CAFR Information

Dear Board Members:

The purpose of this letter is to provide the certification related to materials presented in the Comprehensive Annual Financial Report (CAFR) for the City of Tucson Supplemental Retirement System (TSRS).

Actuarial Valuation Used for Funding Purposes

The valuation report presents the results of the June 30, 2018 actuarial valuation of the Tucson Supplemental Retirement System. The report describes the current actuarial condition of the Tucson Supplemental Retirement System, determines recommended annual employer and employee contribution rates, and analyzes changes in these required rates. This report should not be relied on for any purpose other than the purpose described in the primary communication. Please refer to that report for any information concerning the funding, assumptions and methods of the TSRS.

Certification

The valuation report includes the following exhibits which provide further related information necessary to complete your annual financial report:

- Summary of Actuarial Assumption and Methods
- Schedule of Active Members Counts by Age and Service
- Schedule of Funding Progress
- Schedule of Employer Contributions
- Solvency Test
- Comparative Schedule of Annual Pension Benefits Paid
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Summary of Benefit Provisions
- Schedule of Active Member Average Salary By Age and Service

The Schedules which are required to contain 10 years/ worth of information will be completed with each passing year.

The Board of Trustees
December 6, 2018
Page 2

We certify that the information included herein and contained in the June 30, 2018 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Tucson Supplemental Retirement System as of the valuation date.

The TSRS Board is responsible for establishing the funding policy, and an outline of that policy can be found in the appendix of the June 30, 2018 actuarial valuation report. The actuarial methods and assumptions used in the valuation are adopted by the TSRS Board based upon the experience studies and in consideration of the recommendations of the TSRS' actuary. The actuarial assumptions and methods employed in the funding valuation are the same as those used for financial reporting purposes under GASB 67 and GASB 68.

Contribution Rates

There are no recommended changes to the contribution rates for FY 2019. Based on the TSRS funding policy, the recommended employer rate will remain 27.5%, and the recommended employee rates by tier will remain 5.00%, 6.75% and 5.25%. Full details of these calculations are in the June 30, 2018 actuarial valuation report.

The contribution rate in the June 30, 2018 actuarial valuation report is determined using the actuarial assumptions and methods disclosed in Section G of the valuation report. The report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the System's financial condition.

Financing Objectives

The employer contributions, when combined with the contributions made by members, are intended to cover the Actuarially Determined Contribution (ADC), which is the sum of the Normal Cost and expenses, plus a 20-year open level percent-of-pay amortization payment of the Unfunded Actuarial Accrued Liability (UAAL). The ADC is then rounded up in accordance with the Board's rounding policy.
Based on this funding policy, the System is projected to reach full funding in 2030. Contributions less than the ADC will extend the period to attain full funding.

Benefit Provisions

All of the benefit provisions reflected in the June 30, 2018 actuarial valuation are those which were in effect on June 30, 2018. There were no changes to the benefit provisions since the prior valuation. The benefit provisions are summarized in Section D of the valuation Report.

The Board of Trustees
December 6, 2018
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Assumptions and Methods

There were no changes in actuarial methods and assumptions since the prior report. The Board has sole authority to determine the actuarial assumptions used for the Plan.
The assumptions that are based upon the actuary's recommendations are internally consistent and are reasonably based on the actual past experience of the Plan.

The mortality tables include projection to 2020 to provide margin for future mortality improvement.

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. The actuarial calculations presented in this Report are intended to provide information for rational decision making.

Data

The valuation was based upon information as of June 30, 2018, furnished by Tucson Supplemental Retirement System staff, concerning Plan benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by Tucson Supplemental Retirement System staff.

Actuarial reports used for GASB 67 and GASB 68 reporting

For the GASB 67 and GASB 68 reporting purposes, the valuation date, measurement date of the Net Pension Liability and the reporting date are all June 30, 2018. Please refer to the Tucson Supplemental Retirement System GASB Statement Nos. 67 and 68 Accounting and financial reporting for pensions - June 30, 2018 report for further information on the financial reporting.

We prepared the following scheduled for inclusion in the Financial Section of the TSRS CAFR:
Schedule of Changes in Net Pension Liability and Related Ratios

Sensitivity of Net Pension Liability to the Single Discount Rate

Assumption Schedule of Contributions

Compliance with ASOPs and Qualification Standards

The assumptions and methods which support our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code, and ERISA.

The Board of Trustees
December 6, 2018
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The signing actuaries are independent of the plan sponsor. Leslie Thompson and Dana Woolfrey are Enrolled Actuaries and are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Finally, both of the undersigned are experiences in performing valuation for large public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Leslie Thompson, FSA, FCA,
EA, MAAA Senior Consultant

Dana Woolfrey, FSA, FCA, EA,
MAAA Consultant

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

I. Valuation Date

The valuation date is July 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and
(ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.25%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

2. The employer contributions required to support the benefits of the Plan are determined following a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

3. The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his anticipated covered service, would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf. Effective July 1, 2013 the TSRS funding policy requires the computation of normal cost separately for those members in Tier 1 and Tier 2 (the variable rate tiers).

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 20 years from the valuation date as a level percentage of pay. It is assumed that payments are made throughout the year.

5. Administrative expenses for the recent year will be added to the employer normal cost in the current valuation and will be reflected in the recommended

employer rate for the upcoming fiscal year.

III. Actuarial Value of Assets

The actuarial value of assets is based on recognizing gains and losses over a five-year period where gains and losses are determined by comparing the projected market value return (based on the prior year's market value of assets, cash flows during the year and expected investment returns on those amounts) to the actual market investment return.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 7.25% per annum, compounded annually, composed of an assumed 3.00% inflation rate and a 4.25% real rate of return. This rate represents the assumed return, net of all investment expenses.

2. Salary increase rate:

Sample Attained Age	Percentage Increase in Salary with Less than Five Years of Service		
	Merit	Inflation	Total
0	3.50 %	3.00 %	6.50 %
1	3.00	3.00	6.00
2	2.50	3.00	5.50
3	2.00	3.00	5.00
4	1.50	3.00	4.50

Sample Attained Age	Percentage Increase in Salary with Five or More Years of Service		
	Merit	Inflation	Total
25	1.50 %	3.00 %	4.50 %
30	1.50	3.00	4.50
35	1.50	3.00	4.50
40	1.00	3.00	4.00
45	0.50	3.00	3.50
50	0.25	3.00	3.25
55	0.25	3.00	3.25
60	0.25	3.00	3.25
65	0.00	3.00	3.00

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued

liability, payroll is assumed to increase 3.00% per year. This increase rate is primarily due to the effect of inflation on salaries, with no allowance for future membership growth.

B. Demographic Assumptions

1. Mortality rates (pre- and post-retirement) – RP-2000 Combined Mortality Table for males and females projected with Scale BB to 2020. Mortality rates were adjusted to include margin for future mortality improvement as described in the table name above.

2. Mortality rates (post-disablement) – RP-2000 Disabled Mortality Table for males and females.

Sample Attained Ages	Probability of Death Pre- and Post-Retirement	
	Men	Women
20	0.03 %	0.02 %
25	0.04	0.02
30	0.04	0.02
35	0.07	0.04
40	0.10	0.07
45	0.14	0.11
50	0.20	0.16
55	0.34	0.25
60	0.59	0.41
65	1.00	0.76
70	1.64	1.32
75	2.80	2.21
80	4.76	3.60
85	8.19	6.08
90	14.70	10.55

Sample Attained Ages	Probability of Death Post-Disability	
	Men	Women
20	2.26 %	0.75 %
25	2.26	0.75
30	2.26	0.75
35	2.26	0.75
40	2.26	0.75
45	2.26	0.75
50	2.90	1.15
55	3.54	1.65
60	4.20	2.18
65	5.02	2.80
70	6.26	3.76
75	8.21	5.22
80	10.94	7.23
85	14.16	10.02
90	18.34	14.00

3. Disability rates. Sample rates shown below:

Sample Attained Ages	Probability of Disablement Next Year Men	Probability of Disablement Next Year Women
25	0.01 %	0.01 %
30	0.07	0.07
35	0.09	0.09
40	0.14	0.14
45	0.17	0.17
50	0.25	0.25
55	0.36	0.36
60	0.48	0.48

4. Termination rates (for causes other than death, disability or retirement): Termination rates are based on service and age. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates are shown:

Sample Attained Age	Years of Credible Service	Probability of Termination
Any	0	18.00 %
	1	13.00
	2	10.00
	3	8.00
	4	7.50
20	5 & over	7.05
25		7.05
30		6.65
35		4.65
40		3.65
45		2.95
50		2.55
55		2.45

5. Forfeiture rates: The percentages below represent the probability that a vested terminated member will take a refund of contributions rather than

receive a deferred annuity benefit.

Sample Ages	% of Vested Terminating Members Choosing Refund at Termination
Under 30	50 %
30	45
35	40
40	35
45	30
50	25
55	20
60 and Over	0

6. Retirement rates for Tier 1. For those ages 62+, the Rule of 80 retirement rates only applies if the Rule of 80 is attained by age 62.

Attained Age	Tier 1 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
50-54	27.0 %		
55-59	27.0		8.5 %
60	27.0		
61	27.0		
62	27.0	33.0 %	
63	27.0	16.0	
64	27.0	20.0	
65	27.0	24.0	
66-69	27.0	35.0	
70 & Over	100.0	100.0	

Retirement rates for Tier 2. For those ages 65+, the Rule of 85 retirement rates only applies if the Rule of 85 is attained by age 65.

Attained Age	Tier 2 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
60	27.0 %		8.5 %
61	27.0		8.5
62	27.0		8.5
63	27.0		8.5
64	27.0		8.5
65	27.0	24.0 %	
66-69	27.0	35.0	
70 & Over	100.0	100.0	

Deferred vested members are assumed to retire at age first eligibility for unreduced benefits.

C. Other Assumptions

1. Percent married: 80% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Cost of living adjustment: None.
4. Optional forms: Members are assumed to elect the normal form of benefit.
5. Current and future deferred vested participants are assumed to retire at the earlier of age 62 and eligibility for rule of 80 for Tier 1 and the earlier of age 65 and eligibility for the rules of 85 (but at least 60) for Tier 2.
6. Administrative expenses: Administrative expenses are added to the employer normal cost, before application of the round up policy.
7. Pay increase timing: End of year.
8. Decrement timing: Decrements of all types are assumed to occur mid-year.

9. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

10. Decrement relativity: Decrement rates are used directly, without adjustment for multiple decrement table effects.

11. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

12. Benefit and Eligibility Service due to Accrued Sick and Vacation Leave at Retirement and Termination: Tier 1 Members are assumed to have an additional 0.019 years per year of benefit and eligibility service at early or normal retirement and termination due to accrued sick and vacation leave. This assumption was developed using sick and vacation leave and service amounts for active members included in the actuarial valuation as of June 30, 2013.

Active Member Counts by Age and Service as of July 1, 2018

Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 30	Total
Under 20	2	0	0	0	0	0	0	2
20-24	46	0	0	0	0	0	0	46
25-29	131	19	1	0	0	0	0	151
30-34	109	48	17	0	0	0	0	174
35-39	107	63	60	20	0	0	0	250
40-44	98	58	79	52	14	1	0	302
45-49	84	40	100	74	79	11	0	388
50-54	68	43	73	73	95	35	14	401
55-59	58	44	85	79	60	36	23	385
60-64	42	26	57	45	46	20	28	264
65-69	9	10	14	9	8	10	16	76
Over 70	3	2	5	1	2	1	2	16
Total	757	353	491	353	304	114	83	2,455

Tucson Supplemental Retirement System
Schedule of Funding Progress
$ in thousands

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as a Percentage of Covered Payroll
(1)	(2)	(3)	(4)=(3)-(2)	(5)=(2)/(3)	(6)	(7)=(4)/(6)
6/30/1991	$ 164,268	$ 175,537	$ 11,269	93.6%	$86,830	13.0%
6/30/1992	179,570	187,812	8,242	95.6%	86,205	9.6%
6/30/1993	197,282	208,024	10,742	94.8%	92,867	11.6%
6/30/1994	213,541	230,026	16,485	92.8%	94,180	17.5%
6/30/1995	237,713	249,049	11,336	95.4%	99,847	11.4%
6/30/1996	266,740	269,186	2,446	99.1%	105,230	2.3%
6/30/1997	304,684	297,490	(7,194)	102.4%	110,189	-6.5%
6/30/1998	353,057	348,966	(4,090)	101.2%	113,729	-3.6%
6/30/1999	402,875	400,224	(2,651)	100.7%	126,817	-2.1%
6/30/2000	453,954	437,750	(16,204)	103.7%	134,088	-12.1%
6/30/2001[1]	470,672	486,702	16,030	96.7%	145,059	11.1%
6/30/2001[2]	470,672	495,359	24,687	95.0%	145,059	17.0%
6/30/2002	463,102	553,947	90,845	83.6%	153,580	59.2%
6/30/2003	458,857	601,173	142,316	76.3%	143,164	99.4%
6/30/2004	494,987	645,351	150,364	76.7%	149,782	100.4%
6/30/2005	538,789	693,871	155,082	77.6%	162,149	95.6%
6/30/2006[1]	588,228	734,377	146,149	80.1%	155,855	93.8%
6/30/2006[2]	588,228	735,793	147,565	79.9%	155,855	94.7%
6/30/2007[1]	634,763	758,427	123,663	83.7%	159,250	77.7%
6/30/2007[2,3]	634,763	763,539	128,776	83.1%	159,250	80.9%
6/30/2008	650,227	822,205	171,978	79.1%	153,982	111.7%
6/30/2009	665,298	859,485	194,187	77.4%	149,925	129.5%
6/30/2010	641,819	904,480	262,662	71.0%	141,459	185.7%
6/30/2011	624,665	928,609	303,944	67.3%	121,631	249.9%
6/30/2012	597,107	940,939	343,832	63.5%	125,003	275.1%
6/30/2013	600,330	948,562	348,232	63.3%	125,858	276.7%
6/30/2014	655,998	1,012,393	356,396	64.8%	126,639	281.4%
6/30/2015	706,774	1,021,378	314,604	69.2%	123,415	254.9%
6/30/2016	732,927	1,030,695	297,768	71.1%	115,183	258.5%
6/30/2017	767,988	1,036,687	268,699	74.1%	117,006	229.6%
6/30/2018	803,439	1,053,987	250,548	76.2%	118,152	212.1%

[1] *Before benefit changes*
[2] *After benefit changes*
[3] *Reflects an ad-hoc pension increase*

The funded status measure may be appropriaqt3e4 for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Tucson Supplemental Retirement System
Schedule of Employer Contributions

Fiscal Year Ended June 30,	Annual Required Contribution	Actual City Contribution	Percentage Contributed
1996	8.55 %	8.18 %	95.67 %
1997	8.05	8.38	104.10
1998	8.05	8.38	104.10
1999	7.41	7.91	106.75
2000	6.07	7.35	121.09
2001	6.77	7.35	108.57
2002	6.30	7.35	116.67
2003	8.41	8.41	100.00
2004	11.17	11.17	100.00
2005	14.06	14.06	100.00
2006	14.83	14.83	100.00
2007	15.04	15.04	100.00
2008	15.21	15.21	100.00
2009	14.37	14.37	100.00
2010	16.84	16.84	100.00
2011	18.02	18.02	100.00
2012	23.38	23.38	100.00
2013	28.77	28.77	100.00
2014	27.09	27.09	100.00
2015	26.95	27.50	102.04
2016	27.03	27.50	101.74
2017	25.52	27.50	107.76
2018	25.78	27.50	106.67
2019	23.48	N/A	N/A
2020	21.99	N/A	N/A

Tucson Supplemental Retirement System
Solvency Test

Valuation Date	Aggregate Accrued Liabilities For: (1) Active Member Contributions	(2) Retirants and Beneficiaries	(3) Active Member (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Reported Assets: (1)	(2)	(3)
6/30/1991	$ 44,496,039	$ 72,419,436	$ 86,372,322	$164,268,134	100.0 %	100.0 %	54.8 %
6/30/1992	49,238,019	80,342,604	86,902,648	179,569,858	100.0	100.0	57.5
6/30/1993	55,146,786	85,832,484	98,492,344	197,281,861	100.0	100.0	57.2
6/30/1994	60,424,161	95,449,308	105,838,311	213,540,661	100.0	100.0	54.5
6/30/1995	66,316,408	102,511,728	113,211,848	237,712,863	100.0	100.0	60.8
6/30/1996	72,294,235	109,572,672	118,739,900	266,740,007	100.0	100.0	71.5
6/30/1997	78,991,358	119,508,312	128,878,531	304,684,444	100.0	100.0	82.4
6/30/1998	85,106,175	129,345,816	134,514,294	353,056,577	100.0	100.0	103.0
6/30/1999	92,367,491	139,805,832	168,050,794	402,875,158	100.0	100.0	101.6
6/30/2000	100,413,022	150,527,136	186,809,583	453,953,722	100.0	100.0	108.7
6/30/2001	108,696,394	161,740,968	224,921,223	470,671,667	100.0	100.0	89.0
6/30/2002	118,913,979	187,508,568	247,524,186	463,101,526	100.0	100.0	63.3
6/30/2003	110,195,709	275,193,384	215,784,329	458,856,831	100.0	100.0	34.0
6/30/2004	123,643,527	286,698,084	235,009,321	494,986,798	100.0	100.0	36.0
6/30/2005	135,346,297	298,395,396	260,129,138	538,788,828	100.0	100.0	40.4
6/30/2006	140,387,532	326,828,088	268,577,863	588,227,845	100.0	100.0	45.1
6/30/2007	136,028,896	371,497,680	256,012,354	634,763,193	100.0	100.0	49.7
6/30/2008	125,331,432	473,240,976	223,632,380	650,227,215	100.0	100.0	23.1
6/30/2009	133,633,947	494,923,021	230,928,190	665,298,494	100.0	100.0	15.9
6/30/2010	140,224,998	525,200,232	239,055,106	641,818,551	100.0	95.5	0.0
6/30/2011	119,049,097	614,497,202	195,062,492	624,664,880	100.0	82.3	0.0
6/30/2012	122,240,396	607,450,331	211,247,995	597,106,511	100.0	78.2	0.0
6/30/2013	138,342,388	609,558,963	200,661,102	600,330,066	100.0	75.8	0.0
6/30/2014	142,418,791	647,811,688	222,162,858	655,997,802	100.0	79.3	0.0
6/30/2015	143,648,835	661,292,061	216,436,668	706,773,630	100.0	85.2	0.0
6/30/2016	133,200,540	699,577,704	197,916,702	732,926,710	100.0	85.7	0.0
6/30/2017	133,917,363	706,495,829	196,274,125	767,988,402	100.0	89.7	0.0
6/30/2018	138,420,705	716,751,118	198,815,201	803,439,269	100.0	92.8	0.0

Tucson Supplemental Retirement System
Comparative Schedule of Annual Pension Benefits Paid

Year Ending June 30	Retired Members	Annual Pensions	% Increase	No. of Active Per Retired	Pensions as % of Active Payroll	Average Pensions	Actuarial Present Value	Expected Removals No.	Expected Removals Pensions
1989 [1]	780	$5,344,719	17.6 %	4.2 [2]	6.6 %	$ 6,852	$ 46,556,352	26.6	$ 133,860
1990	832	6,488,714	21.4	3.9	7.5	7,799	57,430,128	28.5	150,864
1991 [1]	918	8,111,103	25.0	3.5	9.3	8,836	72,419,436	29.8	172,608
1992	965	9,010,345	11.1	3.3	10.5	9,337	80,342,604	32.3	208,068
1993 [1]	989	9,704,929	7.7	3.3	10.5	9,813	85,832,484	34.3	235,068
1994	1,035	10,612,612	9.4	3.2	11.3	10,254	95,449,308	35.8	263,340
1995 [1]	1,065	11,429,402	7.7	3.1	11.4	10,732	102,511,728	35.8	270,600
1996	1,105	12,236,298	7.1	3.1	11.6	11,074	109,572,672	37.7	302,952
1997 [1]	1,156	13,391,185	9.4	3.0	12.2	11,594	119,508,312	39.4	325,440
1998	1,208	14,479,476	8.1	2.9	12.7	11,986	129,345,816	42.4	370,344
1999 [1]	1,260	15,721,865	8.6	2.8	12.4	12,478	139,805,832	44.2	402,504
2000 [1]	1,301	16,966,042	7.9	2.8	12.7	13,041	150,527,136	46.2	445,464
2001 [1]	1,355	18,505,247	9.1	2.7	12.8	13,657	161,740,968	47.1	484,776
2002 [1]	1,442	21,273,162	15.0	2.5	13.9	14,753	187,508,568	53.3	622,236
2003 [1]	1,742	29,767,500	39.9	1.9	20.8	17,088	275,193,384	58.2	742,908
2004 [1]	1,753	30,491,864	2.4	2.0	20.4	17,394	286,698,084	55.7	717,888
2005 [1]	1,793	32,027,305	5.0	2.0	19.8	17,862	298,395,396	58.3	781,152
2006 [1]	1,878	35,091,468	9.6	1.7	22.5	18,686	326,828,088	61.1	857,760
2007 [1]	2,018	39,883,032	13.7	1.6	25.0	19,764	371,497,680	66.3	977,328
2008	2,307	49,489,643	24.1	1.4	32.1	21,452	473,240,976	74.4	1,134,019
2009	2,365	50,810,927	2.7	1.3	33.9	21,485	494,923,021	63.8	994,553
2010	2,450	53,115,267	4.5	1.2	37.5	21,680	525,200,232	58.9	948,815
2011	2,709	61,710,576	16.2	1.0	50.7	22,780	614,497,202	63.5	1,059,171
2012	2,704	61,737,864	0.0	1.0	49.4	22,832	607,450,331	66.1	1,125,302
2013	2,719	62,548,233	1.3	1.0	49.7	23,004	609,558,963	69.0	1,200,744
2014	2,764	64,275,837	2.8	1.0	50.8	23,255	647,811,688	70.4	1,219,112
2015	2,809	66,133,217	2.9	0.9	53.6	23,543	661,292,061	73.7	1,301,409
2016	2,945	70,256,788	6.2	0.8	61.0	23,856	699,577,704	75.9	1,392,573
2017	2,974	71,524,930	1.8	0.8	61.1	24,050	706,495,829	77.4	1,457,270
2018	3,031	73,325,441	2.5	0.8	62.1	24,192	716,751,118	80.8	1,555,043

Tucson Supplemental Retirement System
Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year				
Fiscal Year	**Number**	**Annual Allowances**	**Number**	**Annual Allowances**	**Number**	**Annual Allowance**		**Average Annual Allowance**	**Percentage Increase in Allowance**
6/30/2005	68	$3,498,948	42	$485,633	1,791	$	31,990,842	17,796	
6/30/2006	101	$2,335,032	53	$656,383	1,878	$	35,092,308	18,686	4.61%
6/30/2007	213	$6,055,096	36	$403,347	2,018	$	39,883,032	19,764	5.77%
6/30/2008	313	$10,001,857	24	$395,246	2,307	$	49,489,643	21,452	8.54%
6/30/2009	112	$2,005,399	54	$684,115	2,365	$	50,810,927	21,485	0.15%
6/30/2010	141	$3,089,275	56	$784,935	2,450	$	53,115,267	21,680	0.91%
6/30/2011	332	$9,880,306	73	$1,284,997	2,709	$	61,710,576	22,780	5.07%
6/30/2012	64	$1,084,848	69	$1,057,560	2,704	$	61,737,864	22,832	0.23%
6/30/2013	96	$2,027,292	81	$1,216,923	2,719	$	62,548,233	23,004	0.75%
6/30/2014	114	$2,635,101	69	$907,497	2,764	$	64,275,837	23,255	1.09%
6/30/2015	127	$3,157,078	82	$1,299,698	2,809	$	66,133,217	23,543	1.24%
6/30/2016	214	$5,463,524	78	$1,339,953	2,945	$	70,256,788	23,856	1.33%
6/30/2017	124	$2,912,641	95	$1,644,499	2,974	$	71,524,930	24,050	0.81%
6/30/2018	136	$3,062,324	79	$1,261,813	3,031	$	73,325,441	24,192	0.59%

Active Member Average Salary by Age and Service as of July 1, 2018								
Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 29	Total
Under 20	*	*	*	*	*	*	*	*
20-24	$ 31,264	*	*	*	*	*	*	$ 31,264
25-29	36,189	39,439	*	*	*	*	*	36,674
30-34	42,601	41,071	38,179	*	*	*	*	41,747
35-39	40,313	41,790	45,949	43,694	*	*	*	42,308
40-44	45,316	43,064	46,901	52,456	49,354	*	*	46,689
45-49	44,162	52,453	48,105	51,482	50,281	50,453	*	48,853
50-54	46,323	45,636	47,319	51,587	57,307	63,299	56,372	51,824
55-59	53,826	41,339	43,934	51,374	55,607	62,428	58,802	51,091
60-64	44,011	47,165	46,766	56,676	50,674	74,319	68,055	53,135
65-69	63,123	47,372	56,196	51,785	46,267	74,655	76,021	60,890
Over 70	*	*	70,549	*	*	*	*	70,156
Total	$ 42,588	$ 44,005	$ 46,768	$ 51,798	$ 53,647	$ 64,898	$ 65,355	$ 48,127

** Data excluded when cell contains less than five active members.*

SUMMARY OF BENEFIT PROVISONS

JUNE 30, 2018

NORMAL RETIREMENT (NO REDUCTION FACTOR)

Eligibility:

Tier 1 – Members hired before July 1, 2011. Age 62, or a combination of age and creditable service equal to 80 (for those hired on or after July 1, 2009, eligibility at age 62 requires a minimum of 5 years of accrued service).

Tier 2 – Members hired on or after July 1, 2011. Age 65 with 5 years of service or a combination of age and creditable service equal to 85 and the attainment of age 60.

Amount - Creditable service times 2.25% of average final compensation for Tier 1 and 2.00% of average final compensation for Tier 2.

Average Final Compensation - The average monthly creditable compensation for the period of 36 consecutive months during which the member's creditable compensation was the highest during the 120 months immediately preceding the date of retirement for Tier 1 and 60 consecutive months during which the member's creditable compensation was the highest during the 120 months immediately preceding the date of retirement for Tier 2. Effective July 1, 2000, accrued unused sick leave at the final salary may be substituted for an equal number of hours at the beginning of the 36 month period for Tier 1.

EARLY RETIREMENT (REDUCTION FACTOR)

Eligibility - Age 55 with 20 or more years of creditable service for Tier 1 and age 60 with 20 or more years of creditable service tor Tier 2.

Amount - An amount computed as for normal retirement but reduced by 1/2 of 1% per month for each month (6% per year) retirement precedes normal retirement.

DEFERRED RETIREMENT (VESTED TERMINATION)

Eligibility - 5 or more years of accrued service. Deferred retirement benefits for terminated vested employee becomes automatic at age 62 (age 65 for Tier 2) or when a combination of age and creditable service equals 80 (85 with the attainment of age 60 for Tier 2), unless the member elects to withdraw the employee contribution account in lieu of a deferred retirement benefit. In addition to the eligibility listed above, the term-vested member may chose an Early Retirement (minimum age of 55 for Tier 1 and 60 for Tier 2 and minimum service of 20 yrs) subject to the same reduction – reduced by ½ of 1% per month for each month (6% per year) retirement precedes normal retirement eligibility.

Amount - An amount computed as for normal retirement.

DISABILITY RETIREMENT

Eligibility - Eligibility requires 10 or more years of credited service and a disability that is total and permanent.

Amount - An amount computed as for normal retirement. Disability Retirement Benefits are offset, if the combination of all employer-provided benefits exceeds 100% of the members adjusted income base, then members pension benefit from TSRS is reduced so income does not exceed the 100% maximum allowed.

PRE-RETIREMENT SURVIVOR BENEFITS

Eligibility - 5 or more years of accrued service and not eligible to retire.

Amount - Lump sum payment equal to twice the member's contributions, with interest.

Eligibility - After attaining eligibility for retirement, in the event the member dies prior to submitting an application for retirement benefits:

Amount - If the member is married, a default provision allows the member's spouse to elect to receive either a lump sum payment of twice the member's contributions account, or receive a lifetime annuity benefit determined as if the member had elected a joint & last survivor benefit of 100% survivor annuity prior to death. If the member is not married and has named a single non-spousal beneficiary, the beneficiary may elect to receive either a lump sum payment of twice the member's contributions account, or receive a 15 year annuity benefit determined as if the member elected payment of a 15 year term certain annuity. If the member has named multiple designated beneficiaries, a lump sum refund of the member's account balance will be paid to the named beneficiaries.

OTHER TERMINATION BENEFITS

Eligibility - Termination of employment without eligibility for any other benefit.

Amount - Accumulated contributions and interest in members account at time of termination.

EMPLOYEE CONTRIBUTIONS

Interest is credited to member accumulated contributions accounts as simple interest two times per year at an annual interest rate of 6%. For those hired prior to July 1, 2006, employee contributions are 5.00% of salary. For those hired between July 1, 2006 and June 30, 2011 (Tier I variable class) and for those hired after July 1, 2011 (Tier II variable class), employee contributions are 50% of the respective Normal Cost for each class, with a floor of 5.0%. The employee contributions for the Tier I and Tier II variable classes for FY 17/18 are 6.42% and 4.78%, respectively, before application of the floor or roundup policy.

CITY CONTRIBUTIONS

City Contributions are actuarially determined; which together with employee contributions and investment earnings will fund the obligations of the System in accordance with generally accepted actuarial principles. (Please refer to the Funding Policy in Section I of this report).

POST-RETIREMENT ADJUSTMENTS

The TSRS Board has established formal policies to determine whether the system shall fund an annual supplemental post-retirement benefit payment to retired members and beneficiaries.

CITY OF

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TUCSON

CITY OF TUCSON, ARIZONA

Statistical

Discussion of Statistical Section

This section of the Tucson Supplemental Retirement System's comprehensive annual financial report (CAFR) provides detailed financial and non-financial information, often considered relevant to users. The statistical section presents certain information on a trend basis; that is, a summary of information that is provided for each year in a ten-year period. Other non-trend schedules present demographic and participation information for our active and retired membership. Each schedule is defined below with an explanation and an identification of the source of the data.

Statement of Changes in Plan Net Position
This schedule provides the additions and deductions to the plan for the past ten years. The change in net position is provided to illustrate whether or not sufficient resources are available in the current fiscal year to cover plan benefits. This schedule is developed using the Statements of Changes in Plan Net Position for the past ten years.

Retired Members by Type of Benefit
This schedule provides the number of retired members by type of benefit. The TSRS plan benefits include payments for normal retirement benefits, disability benefits, survivor benefits, and term certain benefits paid to members, beneficiaries and alternate payees. The schedule is developed using TSRS' database.

Average Monthly Benefit Payments to New Retirees
This schedule provides the average monthly benefit payments made to new retirees, using six ranges of years of credited service by year. This information is provided to illustrate changes in benefit payments as the amount of service earned increases and indicates the number of employees retired during each of the last 10 years. This schedule is developed using TSRS' database.

Demographics of Retired and Active Members
This schedule provides the age demographics of all retirees, survivors and beneficiaries of retired members for this year only. Similarly, age demographics for the systems active membership are indicated as well as the relative composition of membership categorized by Tier. This schedule is developed using TSRS' membership database.

Employee and Employer Contribution Rates
This schedule provides the contribution rates paid by the Plan sponsor and by City employees during the past 10 years. This schedule is a historical summary of the actual rates paid.

Benefit and Refund Deductions from Net Position by Type
This schedule provides the benefits paid to all service and disability retirees during each of the last 10 years. In addition, the lump sum payments to members elected to participate in the End of Service program since 2007 and refunds associated with member deaths, separation from service and transfers to other retirement systems are summarized. This schedule is developed using the Statements of Changes in Plan Net Position for the past ten years.

Retiree Benefit and Service Summary
This schedule indicates average retiree benefits paid to retirees, based on the number of years retired, indicating eight age categories and the years of credited service served. This schedule is developed using TSRS' membership database.

Tucson Supplemental Retirement System
Statement of Changes in Net Plan Position – Last Ten Fiscal Years

For the Fiscal Years Ending June 30,

	2018	2017	2016	2015	2014
Additions					
City Contributions	$ 31,795,197	$ 31,823,694	$ 33,175,307	$ 33,985,523	$ 34,189,288
Employee Contributions	6,075,912	6,115,389	6,300,714	6,512,180	6,636,833
Purchase of Service	2,485,835	1,258,421	755,299	1,019,665	701,711
Contributions from Other Sources	-	-	-	-	-
Transfers from Other Systems		65,255	27,372	-	-
Total Contributions	$ 40,356,944	$ 39,262,759	$ 40,258,692	$ 41,517,368	$ 41,527,832
Investment Income	-				
Net Gain (Loss) in Fair Value of Investments	$65,251,196	$89,165,007	$8,758,641	$22,467,139	$111,063,362
Interest	5,934,621	6,638,087	6,649,353	6,393,666	5,901,539
Dividends	6,913,192	6,050,746	6,408,886	5,915,832	6,786,728
Real Estate Income	-	-	-	-	-
Securities Lending Income	136,768	142,453	148,059	163,140	134,036
Miscellaneous Income	113,278	189,575	105,713	20,783	91,630
Net Income from Investment Activity	$78,349,055	$102,185,868	$22,070,652	$34,960,560	$123,977,295
Less Investment Expenses:					
Securities Lending Fees	$54,675	$56,952	$59,201	$65,676	$54,589
Investment Services	8,596,792	4,261,291	3,937,354	4,092,449	4,022,476
Total Investment Expense	$8,651,467	$4,318,243	$3,996,555	$4,158,125	$4,077,065
Net Investment Gain	$69,697,588	$97,867,625	$18,074,097	$30,802,435	$119,900,230
Total Additions	$110,054,532	$137,130,384	$58,332,789	$72,319,803	$161,428,062
Deductions					
Benefits	$72,445,792	$71,059,090	$67,910,496	$65,216,458	$63,477,074
Refunds	3,172,406	2,147,211	2,499,342	2,395,893	2,524,939
Transfers to Other Systems		6,856	35,912	-	-
Administrative Expenses	745,753	756,268	786,028	650,405	735,739
Miscellaneous Deductions	-	901	111,679	-	-
Total Deductions	$76,363,951	$73,970,326	$71,343,457	$68,262,756	$66,737,752
Net Change in Plan Net Position	**$33,690,581**	**$63,160,058**	**$(13,010,668)**	**$4,057,047**	**$94,690,310**

Tucson Supplemental Retirement System
Statement of Changes in Net Plan Position – Last Ten Fiscal Years (continued)

	For the Fiscal Years Ending June 30,				
	2013	**2012**	**2011**	**2010**	**2009**
Additions					
City Contributions	$34,523,315	$27,429,666	$23,432,916	$23,260,609	$21,279,535
Employee Contributions	9,200,262	7,685,264	7,562,294	8,041,748	8,156,115
Purchase of Service	1,014,301	1,280,263	3,772,923	1,556,832	1,565,164
Contributions from Other Sources	-	50,000	50,000	50,000	140,512
Transfers from Other Systems	-	204,404	700,009	1,652,656	1,589,190
Total Contributions	$44,737,878	$36,649,597	$35,518,142	$34,561,845	$32,730,516
Investment Income					
Net Gain (Loss) in Fair Value of Investments	$73,705,613	$566,661	$106,114,437	$40,143,355	$(155,121,980)
Interest	4,174,559	6,319,874	6,361,246	7,441,435	11,087,144
Dividends	7,158,084	4,981,339	5,589,052	6,743,309	7,219,584
Real Estate Income	-	-	-	-	-
Securities Lending Income	184,733	157,562	124,158	91,625	359,394
Miscellaneous Income	98,400	16,833	45,681	3,640	120,820
Net Income from Investment Activity	$85,321,389	$12,042,269	$118,234,574	$54,423,364	$(136,335,038)
Less Investment Expenses:					
Securities Lending Fees	$78,604	$68,370	$35,027	$25,401	$197,429
Investment Services	3,805,861	3,460,730	3,871,641	4,096,007	4,580,028
Total Investment Expense	$3,884,465	$3,529,100	$3,906,668	$4,121,408	$4,777,457
Net Investment Gain	$81,436,924	$8,513,169	$114,327,906	$50,301,956	$(141,112,495)
Total Additions	$126,174,802	$45,162,766	$149,846,048	$84,863,801	$(108,381,979)
Deductions					
Benefits	$62,191,480	$61,693,408	$58,247,882	$51,700,541	$51,996,508
Refunds	2,631,221	2,247,225	2,350,626	2,110,360	1,689,956
Transfers to Other Systems	-	-	2,928,607	898,085	2,655,061
Administrative Expenses	689,252	550,604	728,642	672,622	864,382
Miscellaneous Deductions	-	-			
Total Deductions	$65,511,953	$64,491,237	$64,255,757	$55,381,608	$57,205,907
Net Change in Plan Net Position	**$60,662,849**	**$(19,328,471)**	**$85,590,291**	**$29,482,193**	**$(165,587,886)**

Tucson Supplemental Retirement System
Retired Members by Type of Benefit
As of June 30, 2018

Amount of Monthly Benefit	Number of Retirees	Type of Retirement[a] 1	2	3	4	Option Selected[b] 1	2	3	4	5	6	7
$ 1 - $ 250	40	21	12	1	6	26	-	-	1	6	2	5
$ 251 - $ 500	177	107	52	11	7	112	1	2	5	19	8	30
$ 501 - $ 750	243	134	69	33	7	133	-	3	2	47	16	42
$ 751 - $ 1,000	231	135	58	30	8	118	-	2	-	46	18	47
$ 1,001 - $ 1,250	276	190	47	26	13	136	-	-	-	33	37	70
$ 1,251 - $ 1,500	240	183	38	15	4	102	-	1	2	47	38	50
$ 1,501 - $ 1,750	268	236	16	14	2	120	1	-	3	50	34	60
$ 1,751 - $ 2,000	278	251	15	10	2	121	-	3	3	51	42	58
$ 2,001 - $ 2,250	233	214	11	6	2	101	1	5	2	56	25	43
$ 2,251 - $ 2,500	216	203	8	3	2	91	-	-	1	58	19	47
$ 2,501 - $ 2,750	172	166	5	1	-	90	-	2	1	27	14	38
$ 2,751 - $ 3,000	124	123	-	1	-	75	-	-	-	15	14	20
$ 3,001 - $ 3,250	104	103	1	-	-	48	-	-	2	15	8	31
$ 3,251 - $ 3,500	61	60	1	-	-	31	-	1	-	12	7	10
$ 3,501 - $ 3,750	61	61	-	-	-	32	-	-	-	7	6	16
$ 3,751 - $ 4,000	54	53	1	-	-	32	-	-	1	3	3	15
$ 4,001 - $ 4,250	40	39	1	-	-	19	-	-	1	6	3	11
$ 4,251 - $ 4,500	38	38	-	-	-	25	-	-	-	4	6	3
$ 4,501 - and over	175	175	-	-	-	92	-	1	3	26	22	31
	3,031	2,492	335	151	53	1,504	3	20	27	528	322	627

Notes:

[a]Type of retirement

1 - Normal retirement for age and service
2 - Beneficiary payment, normal retirement
3 - Disability retirement
4 - Beneficiary payment, disability retirement

[b]Option selected:

1 - Single life; beneficiary receives lump sum of member's unused contributions
2 - Beneficiary receives remainder of 5 yr term, if applicable
3 - Beneficiary receives remainder of 10 yr term, if applicable
4 - Beneficiary receives remainder of 15 yr term, if applicable
5 - Beneficiary receives 75% of member's reduced benefit
6 - Beneficiary receives 50% of member's reduced benefit
7 - Beneficiary receives 100% of member's reduced benefit

This schedule indicates the retirement benefit option types selected and paid to members, showing the level of income and the number of retirees in each cateory.

Tucson Supplemental Retirement System
Average Monthly Payments to New Retirees
As of June 30, 2018

Retirement Effective Dates	Years of credited service:						
For Fiscal Years Ending June 30:	<5	5 - 9	10-14	15-19	20-24	25-29	>30
2018							
Avg monthly benefit	n/a	$ 543	$ 929	$ 1,409	$ 2,116	$ 3,431	$ 3,422
Avg monthly final avg comp	n/a	3,774	3,386	3,919	4,512	5,671	5,290
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2017							
Avg monthly benefit	n/a	599	1,184	1,540	2,368	2,812	4,236
Avg monthly final avg comp	n/a	3,747	4,078	4,409	5,164	4,810	6,099
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2016							
Avg monthly benefit	n/a	677	1,001	1,439	2,155	2,868	3,854
Avg monthly final avg comp	n/a	3,829	4,076	3,883	4,465	4,977	5,660
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2015							
Avg monthly benefit	n/a	803	1,077	1,670	2,202	2,968	3,864
Avg monthly final avg comp	n/a	5,267	3,679	4,698	4,645	5,118	5,506
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2014							
Avg monthly benefit	n/a	635	1,024	1,665	2,364	2,693	4,188
Avg monthly final avg comp	n/a	4,040	4,005	4,255	4,870	4,617	6,061
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2013							
Avg monthly benefit	507	578	1,275	1,669	2,060	2,956	3,876
Avg monthly final avg comp	5,609	3,077	4,497	4,121	4,041	4,680	5,124
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2012							
Avg monthly benefit	237	563	923	1,829	1,428	2,401	2,745
Avg monthly final avg comp	2,728	3,355	3,240	4,787	2,767	3,869	3,745
Number of active/EOSP retirees	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2011							
Avg monthly benefit	519	560	964	1,913	2,303	2,998	3,780
Avg monthly final avg comp	2,865	3,350	3,352	4,774	4,509	4,899	5,044
Number of active/EOSP retirees	5	12	18	24	83	107	58
		1-9	10-14	15-19	20-24	25-29	>30
2010							
Avg monthly benefit		481	931	1,466	2,374	2,386	3,376
Avg monthly final avg comp		3,229	2,976	3,841	5,148	4,251	4,871
Number of active/EOSP retirees		23	16	13	35	23	13
2009							
Avg monthly benefit		620	1,117	1,452	2,165	3,475	2,811
Avg monthly final avg comp		3,474	3,823	3,671	4,281	5,775	3,942
Number of active/EOSP retirees		14	13	12	23	15	9
2008							
Avg monthly benefit		645	1,076	1,502	2,258	3,133	3,944
Avg monthly final avg comp		4,302	4,542	3,869	5,094	5,310	6,222
Number of active/EOSP retirees		18	16	27	74	84	63
2007							
Avg monthly benefit		648	725	1,360	2,010	2,999	3,730
Avg monthly final avg comp		3,947	2,922	3,687	4,258	5,086	5,589
Number of active/EOSP retirees		12	11	33	42	55	48

*Includes EOSP Participants still employed and alt. payees receiving benefits

Tucson Supplemental Retirement System
Demographics of Retired and Active Members
As of June 30, 2018

Retired Members

	Retirees			Survivors/Beneficiaries		
Ages	Male	Female	Total	Male	Female	Total
Under 55	27	35	62	3	17	20
55 to 59	122	121	243	0	26	26
60 to 64	312	243	555	4	38	42
65 to 69	462	253	715	8	56	64
70 to 74	343	163	506	4	44	48
75 to 79	182	99	281	4	71	75
80 to 84	121	53	174	6	60	66
85 to 89	46	27	73	0	25	25
90 to 94	17	14	31	3	16	19
95 to 100	2	1	3	0	3	3
101 and over	0	0	0	0	0	0
Total	1,634	1,009	2,643	32	356	388

Active Members

	Active Members			Percentage Distribution		
Ages	Male	Female	Total	Male	Female	Total
Under 20	1	1	2	0.04%	0.04%	0.08%
20 to 29	98	99	197	3.99%	4.03%	8.02%
30 to 39	237	187	424	9.65%	7.62%	17.27%
40 to 49	379	311	690	15.44%	12.67%	28.11%
50 to 59	467	319	786	19.02%	12.99%	32.02%
60 to 69	223	117	340	9.08%	4.77%	13.85%
70 and over	10	6	16	0.41%	0.24%	0.65%
Total	1,415	1,040	2,455	57.64%	42.36%	100.00%

Composition of Active TSRS Membership by Tier

	Membership	Payroll	% of Payroll
Tier 1 - Fixed Contribution Rates	1,156	$ 61,639,153	52.17%
Tier 1 - Variable Contribution Rates	264	12,268,942	10.38%
Tier 2 - Variable Contribution Rates	1,035	44,244,023	37.45%
	2,455	$ 118,152,118	100.00%

Tucson Supplemental Retirement System
Employee and Employer Contribution Rates
As of June 30, 2018

Fiscal Year		Employee Rate (percentage)		Employer Rate (percentage)		Total Contribution (percentage)
		Fixed	Variable	Fixed	Variable	
08/09		5.0	7.788	14.47	11.682	19.47
09/10		5.0	8.852	17.13	13.278	22.13
10/11		5.0	9.428	18.57	14.142	23.57
11/12		5.0	11.62	24.05	17.43	29.05
12/13		5.0	13.976	29.94	20.964	34.94
13/14	Tier I	5.0		27.32		32.32
13/14	Tier I		6.715		25.61	32.32
13/14	Tier II		5.06		27.26	32.32
14/15	Tier I	5.0		27.22		32.22
14/15	Tier I		6.67		25.55	32.22
14/15	Tier II		5.14		27.08	32.22
15/16	Tier I	5.0		27.23		32.23
15/16	Tier I		6.62		25.61	32.23
15/16	Tier II		4.91		27.32	32.23
16/17	Tier I	5.0		27.23		30.69
16/17	Tier I		6.6		25.61	30.69
16/17	Tier II		4.89		27.32	30.69
17/18	Tier I	5.0		25.93		30.93
17/18	Tier I		6.55		24.38	30.93
17/18	Tier II		4.89		26.04	30.93

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BofA: Managers expect economy to slow, but see chance of recession as slight

Rob Kozlowski

A majority of investors are bearish on the economy, but still few expect a global recession in 2019, said Bank of America Merrill Lynch's monthly fund manager survey released Tuesday.

A net 60% of surveyed investors this month expect global growth to weaken over the next 12 months, up from 53% the previous month. It is the worst outlook on the economy since the July 2008 survey. However, investors are saying they expect secular stagnation over the next two to three quarters rather than an outright global recession, with only 14% of surveyed investors expecting that in 2019, up from 9% in December.

The current month also has seen a collapse in inflation expectations, with just a net 19% expecting the global consumer price index to rise over the next year. That number is down 18 percentage points from a net 37% in December, which itself was down 33 percentage points from 70% in November. It continues the major reversal from the recent peak of a net 82% in April 2018.

A possible trade war remains the biggest tail risk for managers, with 27% of respondents putting it at the top of a list of concerns, although the number is down from the 37% that cited it as the biggest concern in December. Rounding out the top three are a China slowdown and quantitative tightening, each receiving 21% of responses.

After reaching a two-year low in December, which saw the allocation to global equities fall 15 percentage points to a net 16% overweight, equity allocations improved 2 percentage points in January to a net 18% overweight.

Fixed income, meanwhile, saw its allocation drop 7 percentage points for January to a net 42% underweight after December saw the highest bond allocation since the U.K.'s vote to leave the European Union in June 2016.

Broken down regionally, the allocation to U.S. equities dropped 5 percentage points to net 1% overweight. Allocation to eurozone equities, meanwhile, declined another 4 percentage points from December, bringing it to a net 11% underweight, continuing what has been a gradual cutting of those allocations since the fourth quarter of 2017.

Investor allocations to emerging markets equities jumped 11 percentage points from December, bringing it to a net 29% overweight and U.K. equities rose 1 percentage point to a net 38% underweight, still the largest underweighting among surveyed investors after reaching the second biggest on record in December as the approaching Brexit deadline stoked renewed uncertainty.

The average cash balance saw a slight uptick to 4.9% from 4.8% in December.

"Investors remain bearish, with growth and profit expectations plummeting this month," said Michael Hartnett, chief investment strategist at BofA Merrill Lynch Global Research, in a news release about the survey results.. "Even so, their diagnosis is secular stagnation, not a recession, as fund managers are pricing in a dovish Fed and steeper yield curve."

The survey of 234 money managers representing a total of $645 billion in assets under management was conducted Jan. 4-10.

Original Story Link: https://www.pionline.com/article/20190115/ONLINE/190119922/bofa-managers-expect-economy-to-slow-but-see-chance-of-recession-as-slight

Infrastructure, real estate to remain high on investor lists

Arleen Jacobius

Brent Burnett said investors like the long-term cash flow they get with infrastructure.

Real estate and infrastructure are expected to remain the most popular of all the real asset sectors in 2019, despite increasing leverage in real estate and slow distributions in infrastructure, industry executives say.

The new year is expected to build on the asset classes' popularity in 2018.

In 2018 as of Dec. 20, infrastructure funds raised a total of $83.8 billion worldwide, compared to 88 funds that closed on $75.1 billion in all of 2017, a record year in terms of total capital raised by infrastructure funds, according to London-based alternative investment research firm Preqin.

"The biggest growth in real assets is in infrastructure, although it started from a base that was non-existent and it has grown from that," said Brent Burnett, Portland-based managing director, real assets at Hamilton Lane Inc. "Investors are attracted to the income, long-term contracted cash flow."

Capital is also expected to continue to flow into real estate. Through Dec. 20, real estate funds raised $94 billion in 212 funds, compared to $126 billion raised by 379 funds in all of 2017, Preqin data show.

The combined $197.5 billion raised by real estate and infrastructure funds amounted to 90% of the $219.3 billion raised in real asset funds in the same time period.

Aside from real estate and infrastructure, fundraising efforts in other real asset sectors, including energy, agriculture, metals and mining, and farmland, "continue to be challenged," Mr. Burnett said.

He expects these trends to continue into 2019.

"In energy, there is lots of volatility at the commodity price level," he said. "Returns have been disappointing. It's been a challenging exit environment."

There still will be good energy investment opportunities, but investors have to be selective where they invest capital, Mr. Burnett said.

Bright spots

Overall, there could be a few bright spots for real asset investments. "The macro trends are supportive for senior housing, industrial, data centers and cell towers," Mr. Burnett said.

There is also increased institutional investor interest in investing in water ,but "the real challenge is monetization," he said.

There is "headline risk" in taking water from one place to another. Instead, there could be a way to divert the excess water created by sustainable farming, for example, for use by cities and counties, Mr. Burnett said. Some state and local water districts are proposing plans, but it is very state, county and city specific, Mr. Burnett said.

A growing number of institutional investors are expected to look for ways to invest directly in energy, said Gordon Huddleston, partner and co-president at Aethon Energy Management LLC, an oil and gas manager, operator and developer focused on direct investments in North American onshore oil and gas.

Its latest fund, Aethon III, is an investment vehicle formed to acquire onshore North American assets in partnership with the C$193.9 billion ($145.2 billion) Ontario Teachers' Pension Plan, Toronto, and private equity firm Redbird Capital Partners LLC.

"There's been a desire to eliminate intermediaries regardless of asset class," said Albert Huddleston, partner, CEO and founder of Aethon.

Added Gordon Huddleston, "Energy lends itself uniquely to direct investing. ... Next year, I am seeing a lot of direct investment interest."

Agriculture to suffer

Agriculture is expected to suffer in 2019 from lack of investor interest, industry executives say. U.S. tariffs have a disproportionate ability to affect agriculture properties, Hamilton Lane's Mr. Burnett said.

"(Tariffs) inject another level of uncertainty for non-U.S. markets. Asia has been a key market for row crops," such as soybeans, Mr. Burnett said. Asia also has been a key growth market for fruit such as apples and cherries, he said.

"The tariffs have injected a new level of uncertainty around the long-term value of those assets," Mr. Burnett said.

Another factor making agriculture less attractive to investors is that until six to nine months ago, the land values were rising faster than the expected income derived from the investment, he said.

"This relationship is unsustainable, as land values should reflect their prospective ability to generate income," Mr. Burnett said.

Only recently have land values started to soften a bit to reflect lower income expectations, he said.

"This, coupled with the tariff impacts makes us cautious and highly selective on agriculture investments," Mr. Burnett explained.

As for infrastructure, a growing theme for investors into 2019 is that they want more distributions from their infrastructure investments, Mr. Burnett said. Infrastructure distributions have been lower than other real assets, he said.

Most infrastructure funds are similar to private equity funds, he said. They have the same fund lives as private equity funds and a strategy to buy, fix and sell, and so investors want to see some realizations, he added.

Many infrastructure managers such as IFM Investors are not only making equity investments but also are investing in credit.

"In the past 12 months, most competitors were promoting mezzanine but now more funds are in the market focusing on senior secured," said Rich Randall, New York-based executive director, global head of debt investments at infrastructure manager IFM Investors.

Senior secured loans provide lower returns than mezzanine but are seen as safer, he said.

While issues in the broader economy could affect the infrastructure sector, which tends to be fairly resilient, he expects a resolution of the U.K.'s withdrawal from the European Union next year could unleash a backlog of infrastructure deals in Europe.

Macroeconomic issues

Real estate managers are also considering the impact of macroeconomic issues on their portfolios in 2019.

In the past few months, "all of the volatility and noise" in the stock and bond markets came in response to macroeconomic problems such as the U.S.-China trade wars and Brexit, said Jacques Gordon, Chicago-based global strategist at real estate manager LaSalle Investment Management.

Although the hotel sector will react immediately, the rest of the real estate sectors "are insulated from a lot of that noise."

What LaSalle executives do worry about is volatility, which combined with rising interest rates, wage inflation, weakening of the housing market, and high levels of household and student debt could lead to a gradual slowdown in the U.S. economy in 2019 and 2020, with the potential for a mild recession in 2021.

"We've been warning clients about volatility for two years in a row. This is the third year," Mr. Gordon said.

Still, as long as the economic growth "tapers, rather than plunges" real estate should perform well, a recent LaSalle report states.

Brad Case, Washington-based senior vice president at industry group Nareit, said in an interview he is "sanguine about the macroeconomic" factors because he is optimistic commercial real estate can withstand those risks.

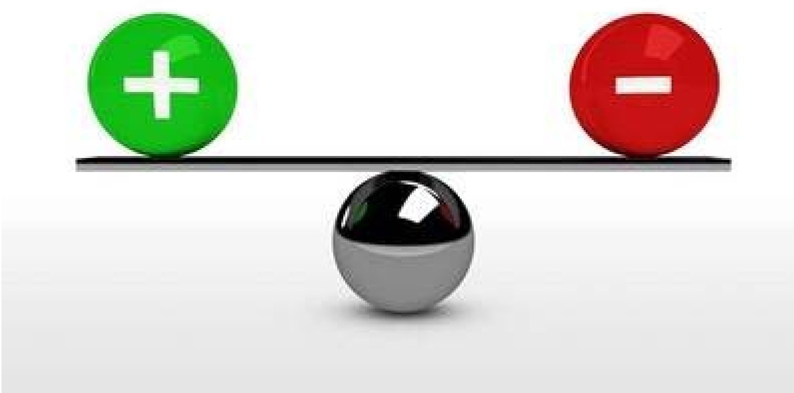
He said he would be more concerned if there were more than a few pockets of oversupply.

Indeed, the pace of new construction remains below the level of a little more than 1.5% of GDP that was typical before the construction collapse that began in 2008, he said in Nareit's economic outlook for 2019.

Original Story Link: https://www.pionline.com/article/20190107/PRINT/190109957/infrastructure-real-estate-to-remain-high-on-investor-lists

Investors shifting focus to bonds, private markets away from equities — survey

Rob Kozlowski



Getty Images/iStockphoto

Global institutional investors concerned that the economic cycle is turning are mitigating risk by planning to reduce exposure to equities and turning more to fixed income and private markets, an annual BlackRock survey says.

The money manager's 2019 Global Rebalancing Survey of 230 global institutional clients shows that 51% plan to decrease allocations to equities in 2019, up significantly from the 35% that planned those reductions for 2018 and the 29% that planned them for 2017 in prior BlackRock surveys. Those plans are particularly pronounced in U.S. and Canada, where 68% of surveyed clients plan to reduce equity allocations in 2019, compared to 27% of clients in continental Europe.

Among clients globally, 38% of survey respondents plan to increase allocations to fixed income this year, up from 29% in 2018. Within fixed income, the survey also reflected the increasing focus on private credit, with 56% of respondents saying they plan to increase their allocations. Clients also embraced increasing allocations to private markets. Among surveyed clients, 54%, 47% and 40%, respectively, plan to increase allocations to real assets, private equity and real estate.

The survey results reflect clients' expectations that the economic cycle is at last turning, a decade after the start of a bull market. Thirty-seven percent of surveyed clients said the possibility of the cycle turning is the top macro risk affecting asset allocation and rebalancing, and 19% said it is the second most important macro risk.

"We have been emphasizing the potential of alternatives to boost returns and improve diversification for some time, so we're not surprised to see clients increasing allocations to illiquid assets, including private credit," said Edwin Conway, global head of BlackRock's institutional client business, in a news release announcing survey results.

Among other asset classes, 66% of respondents said they do not plan to change their allocations to hedge funds, and 65% also said they plan to stay the course with their cash allocations.

BlackRock clients were surveyed in November and early December, representing over $7 trillion in assets.

The survey is available on BlackRock's website.

Original Story Link: https://www.pionline.com/article/20190107/ONLINE/190109915/investors-shifting-focus-to-bonds-private-markets-away-from-equities-8212-survey